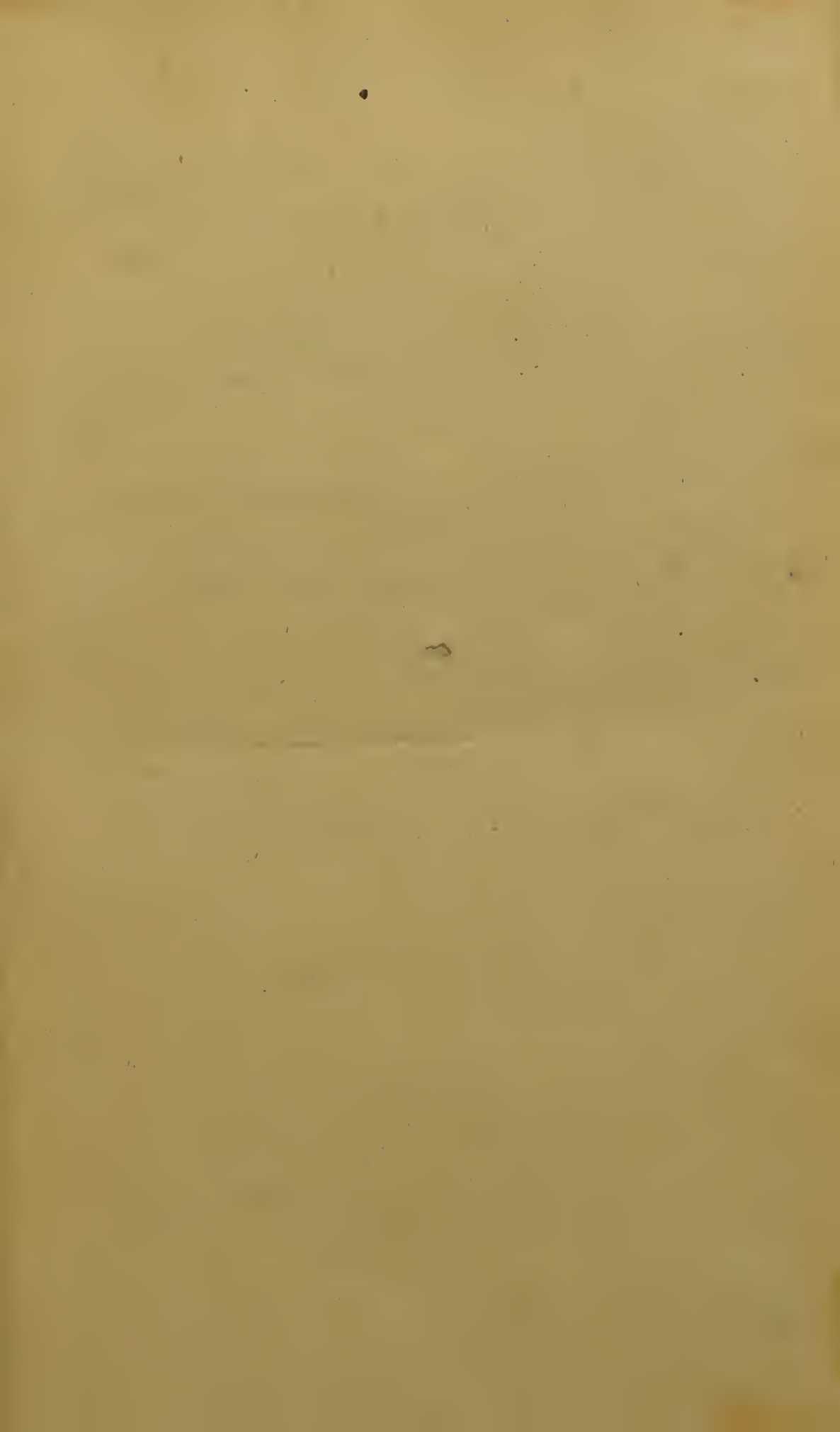
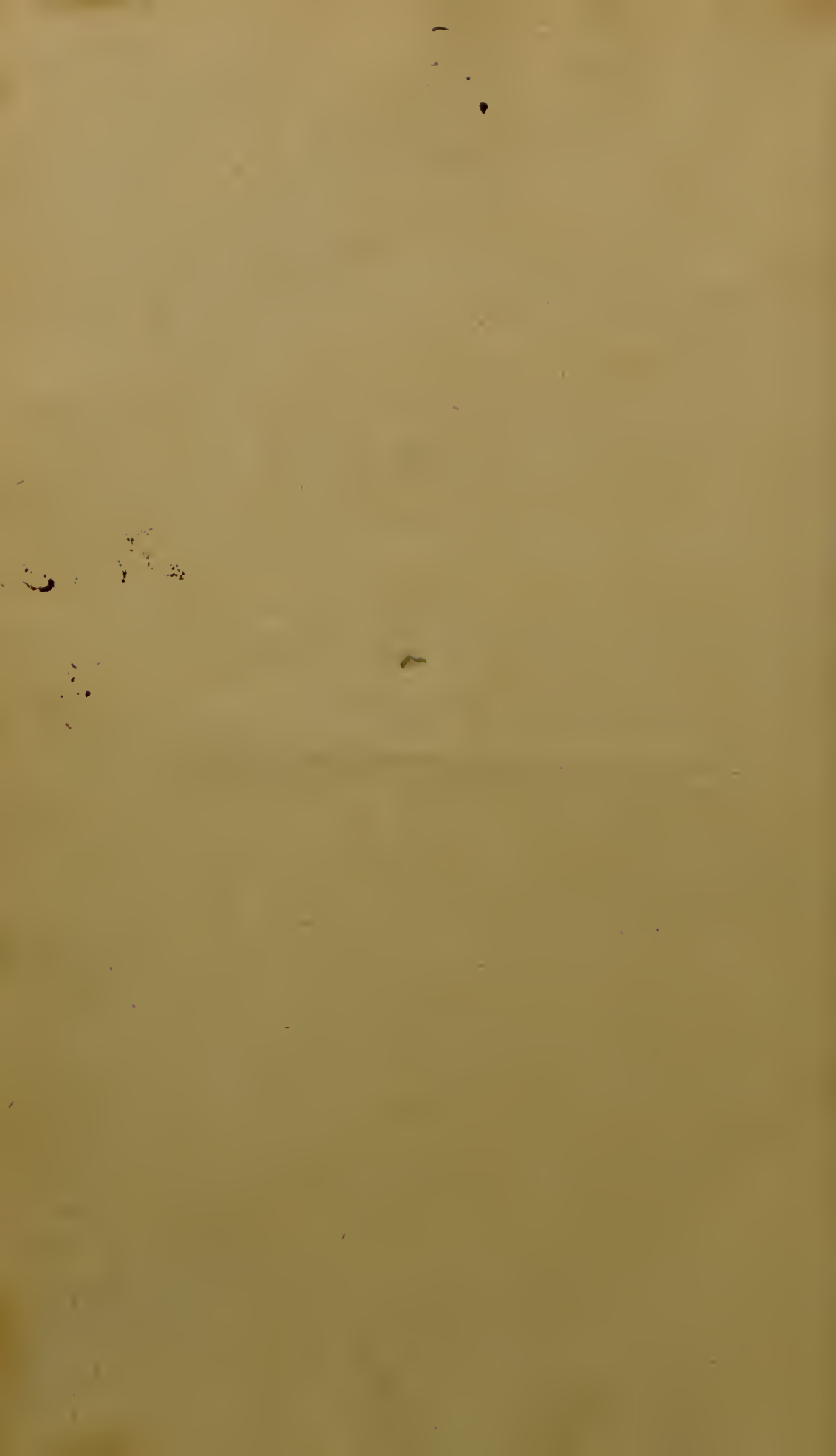




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TREATISE

ON THE

HYDROCELE,

Medicor. ON *Edinburgens.*
SARCOCELE, OR CANCER,

AND OTHER DISEASES OF THE TESTES. *H. e.*

H. e. 23.
BY

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ROYAL INFIRMARY OF EDINBURGH.

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ADVERTISEMENT.

THE Author, in his System of Surgery, delivered his sentiments on the several subjects contained in the present Volume. The Public will therefore expect his reasons for submitting to them, in this manner, what, in some sort, may be considered as a republication.

The improvements that he now suggests in the treatment of hydrocele by the simple incision, he conceives to be important, and that they render the operation, easy, certain, and safe. A late attempt to bring
A ij forward

forward again the use of injections for the cure of the hydrocele, and which had long been disused in this country, appearing to arise from an ill-founded dread of the operation by incision, he has been induced, and his experience justifies the measure, to vindicate the safety and success of this operation; and, at the same time, to give an account of the rise and progress of the mode of treatment by injection, and to subjoin his reasons for thinking that it should not be adopted.

He also flatters himself, that the alterations he proposes in the operation for the sarcocele, will be found to prove useful.

Farther, he complies with a request made by many, to have his observations
on

on the hydrocele, and diseases of the testes, comprised in a distinct treatise.

This information the Author has thought it right to communicate, that those who are already possessed of his System of Surgery, may judge whether they should have the present publication or not.

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A
T R E A T I S E
ON THE
HYDROCELE,
AND OTHER DISEASES OF THE TESTES.

CHAPTER I.
ON THE HYDROCELE.

SECTION I.

General Remarks on the Hydrocele.

EVERY tumor formed by a collection of water, may, from the import of the word, be called a hydrocele, but, in chirurgical language, the term implies a watery swelling in the scrotum or spermatic cord.

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This,

This, as well as all tumors in the scrotum or groin, not immediately produced by the protrusion of parts from the abdomen, were, by ancient writers, termed false or spurious herniæ, from the resemblance which they bear to the true hernia, or rupture ; but no advantage is derived from this distinction : and, as it arose from an erroneous opinion of the origin of herniæ, I should not have taken notice of it here, but with the view of making the writings of the ancients upon this subject intelligible.

Indeed, the doctrines of the writers of the last and preceding centuries, concerning hydrocele, are so confused and perplexed, that they do not merit attention ; for, as they were ignorant of the anatomy of the parts in which the disease is seated, the ideas which they formed of
is

it gave rise to an erroneous pathology and pernicious practice. Not being acquainted with the structure of the parts affected, they proceeded with much unnecessary dread in the treatment of the diseases to which they were liable ; for, by supposing an immediate connection to subsist between the coats of the testicle, the cavity of the abdomen, liver, kidneys, and other viscera, they were induced to consider the collection of water in hydrocele, as a deposition from these parts, and as tending to free them, and perhaps the system at large, from diseases of importance.

In consequence of this, their practice was timid and indecisive ; so that every surgical operation, in which these parts were concerned, became a matter of much importance to resolve upon, and very tedious, painful, and uncertain in the execution,

From the time of Celsus to the middle of the last century, little progress seems to have been made in this part of surgical pathology. Indeed, from Celsus downwards, authors seem to have copied almost exactly from one another, till Wiseman, Le Dran, Garangeot, and Heister, gradually elucidated the subject; but it was not clearly understood, till the discoveries of Monro, Haller, Hunter, and Pott, made the anatomy of the parts plain and intelligible. So much attention, however, is still given to the confused accounts of ancient writers, that the real nature of the diseases of the testes, and their appendages, is, from this cause alone, less understood than it otherwise would be. There is perhaps no part indeed of surgery, with which students in general are so little acquainted.

Nothing

Nothing but a strict attention to the discoveries of late anatomists, can convey clear and distinct ideas concerning them; and, whoever will make himself acquainted with these, will find, that the hydrocele, and other affections of the testes, may be explained with as much clearness and simplicity as any other class of diseases. Before proceeding, therefore, to treat of the diseases of these parts, I shall premise a short anatomical account of the peritoneum, testes, and their coverings, the tunica albuginea, tunica vaginalis, and scrotum, the parts more or less immediately the seat of these diseases.

The peritoneum is a firm, smooth, somewhat elastic membrane, that lines the whole cavity of the abdomen. It also furnishes the external covering to almost all the viscera contained in it; but in so singular a

manner are these coverings produced, that, although at first view, the different viscera appear all to be contained within the cavity of the peritoneum, yet anatomical investigation shows, that in reality; they lie behind it.

This membrane, after having completely lined the cavity of the abdomen, is continued or reflected over all the viscera, so as to form, as I have observed above, the external covering of each : after surrounding one viscus, it stretches along to the most contiguous, forming in its course the supporting membranous ligaments of the liver, and other viscera, and affording, in its duplicature, a kind of support or connection to the various blood vessels, as they stretch along to their destined situations in the intestinal canal and other organs.

Behind

Behind the peritoneum, there is a quantity of loose cellular substance, by authors commonly termed its appendix. In some parts this substance is filled with fat; in others it is empty, and can easily be filled with air.

The testes in the foetus, till near the period of delivery, are lodged in the cavity of the belly, in the same manner with the rest of the abdominal viscera. Till then, they are situated immediately below the kidneys, on the fore part of the psoæ muscles, near to the upper end, and by the side of the rectum, where their external covering adheres, by its posterior surface, to those parts of the peritoneum on which they rest, while all their anterior and lateral surfaces lie loose in the cavity of the abdomen, in contact with the other viscera. Even in this situation, however, a

connection takes place between the testes and scrotum. This is formed by means of a substance which runs down from the under end of the testes to the scrotum, forming a kind of pyramidal shaped ligament; its bulbous head being fixed to the lower end of the testis and epididymis, and its under extremity, after having passed through the ring or opening in the external oblique muscle, being lost in the cellular membrane of the scrotum. This ligament is evidently vascular and fibrous, and seems in part to be composed of the cremaster muscle turned inwards.

All that portion of the ligament contained within the parietes of the abdomen passes behind the peritoneum, and receives a covering from it, in the same manner with the testes and other viscera; and the peritoneum even gives a coat to a portion

tion of this ligament, after it has got into the groin, by passing down along with it from the abdomen into the upper part of the inguen. At this part, viz. at the annular opening of the external oblique muscle, the peritoneum is very loose; and when the ligament and scrotum are drawn downwards, an aperture is observed from the cavity of the abdomen, all around the fore part of the ligament, which seems ready to receive the testis; and this aperture gradually becomes larger, as the testis descends behind the peritoneum, in its way to the scrotum.

While the testicle is descending, it does not fall down, as has been commonly imagined, along the fore part of the peritoneum, between it and the other viscera; but the ligament I have described, as lying behind the peritoneum, and which is connected

ned with the testis at its under and posterior part, by directing or pulling it down, as it were, from behind, brings it, in this manner, along the psoas muscle, between it and the peritoneum ; and that part of this membrane, to which we have seen that the testicle adheres, being necessarily drawn along with it, a kind of pouch or bag, somewhat resembling the finger of a glove. is thus formed by this elongation of the peritoneum ; the under extremity of which still continues to surround the testis, as it goes along, in the same manner as it did while the testicle rested upon the psoas muscle, and the entrance from the abdomen to the cavity of this process, is exactly at that point where the testis was originally seated ; for it is there that this process commences, where the testis begins to descend. The peritoneum being in a foetus remarkably lax and dilatable

dilatable at this part ; and being connected posteriorly, as has been observed above, with a quantity of loose cellular substance, its elongation produced by the descent of the testicle, is, in this manner, provided for by nature, and, of course, is easily admitted of.

It must not, however, be supposed, that the testis and peritoneum, in coming along, fall down without connection ; for, as they slide down slowly, they still continue to adhere to the parts behind them, as they did when in the abdomen.

After the testis has passed the tendon of the external oblique muscle, which it most frequently does about a month or five weeks before birth, it commonly remains for some time by the side of the penis, and by degrees only descends to the bottom of the scrotum ;

scrotum ; and even when entirely in the scrotum, its ligament is still connected with it, and lies immediately under it, in a shortened and compressed state.

The process of the peritoneum, which we have shown to descend with the testicle, continues to cover it when it has reached the scrotum ; and it is this loose covering or bag which is afterwards converted into what anatomists term the *tunica vaginalis testis*. From this description, it is evident that the cavity of this bag must at first communicate with the great peritoneal cavity of the abdomen. This it accordingly does, as a probe may be passed readily and easily along this process or bag, from the belly down to the bottom of the scrotum ; and, if laid open through its whole length, on the fore part, it will be plainly seen to be a continuation
of

of the peritoneum; the testis and epididymis will be found at the lower part of it, without their loose coat, the tunica vaginalis; and, as the spermatic cord, consisting of the spermatic artery and vein, with the vas deferens, while the testicle remained in the abdomen, entered the body of that gland behind, and between the reflected lamina of the peritoneum, so here, when in the scrotum, they are found covered by the posterior part of the bag in their whole course, from the commencement of that process, down the groin to the testicle.

This passage, from the cavity of the abdomen to the scrotum, is, in general, soon cut off, by a firm adhesion taking place between it and the spermatic cord, which it envelopes, from the inside of the abdominal muscles, along the whole course of the
cord,

cord, till it reaches the testicle. This obliteration of the upper part of the peritoneal process is, in general, complete at birth; but it must be remembered, that the under extremity of the sac still remains open and loose during life, forming, as has been already described, the tunica vaginalis testis, the common seat of a hydrocele.

Even the under part of the sac, however, although entirely loose in all other parts, is firmly attached to the testicle behind. As, from the foregoing description of these parts, it appears, that the testis, while in the abdomen, is firmly attached to the peritoneum behind; so, when in the scrotum, as the vaginal coat with which it is there furrounded, is evidently a continuation of the peritoneum, it must of necessity be still connected with that membrane, in the same manner as while it remained

mained in the abdomen. And accordingly we find, that, although the testicle lies loose in this sac, or vaginal coat, in every other part, yet, along its posterior part, it is firmly attached to it. At this part, the different vessels of the testis still enter; and at this the peritoneum, or what is now the tunica vaginalis, is reflected over it, and every where closely attached to it, thereby forming the tunica albuginea, or immediate covering of the testicle; so that the tunica albuginea is demonstrably a mere continuation of the other, or vaginal coat.

The inferior part of this process of the peritoneum being somewhat wider below than above, leaves the tunica vaginalis of a pyramidal form; and it is also somewhat longer than the testis, reaching from the superior part of the epididymis, where it begins, to a little below the inferior point of the testicle where it terminates.

minates. It is altogether of such a size as to allow the testis to roll easily within it; its principal use appearing to be, to retain a small quantity of a fine exhalation, which is constantly secreting, either from its own surface, or from the surface of the testis itself, for the purpose of keeping the latter moist and easy.

The vaginal coat, of which I have thus given a description, is the only loose covering belonging either to the spermatic cord or testis: For although, by many, a vaginal coat of the spermatic cord is also described, together with a supposed septum between it and the vaginal coat of the testis, yet no such covering is, on dissection, found to exist. The upper part of what may be called the spermatic process of the peritoneum, is evidently closed, as has been described above, soon after the descent of the testicle; and a firm adhesion taking

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place

place between the cord and that part of the sac with which it is enveloped, no vestige can be traced, either of a vaginal coat of the spermatic cord, or of any particular septum between this coat and the testicle: This, it is of importance to notice, as the diseases of these parts cannot otherwise be understood.

As the diseases we are now to consider are chiefly seated in the coverings of the testis, I have given a more particular description of them, than is necessary in speaking of the testis itself; with respect to which, I shall only observe, that it is evidently very vascular, being composed almost entirely of different convolutions of blood vessels.

Besides the vaginal coat proper to each testicle, the two testes have for their far-

ther protection, a more external covering, the scrotum ; a bag formed almost entirely of skin and cellular substance ; for that body, the dartos, which has been commonly described as muscular, is now clearly proved to be altogether cellular. Even the septum scroti, or that membrane which divides one testicle from another, is composed of cellular substance in a more condensed state. By air it is easily inflated, and it is also pervious to water ; so, of course, it partakes of all those watery effusions, to which the more external parts of the scrotum are liable.

This structure of the scrotum it is necessary to be acquainted with, as, from the descriptions which, till of late, have been given of it, young practitioners are induced to consider it as muscular, and to suppose the septum, with its rapha, to be ligamentous ;

mentous; and hence they are led to be more cautious than they need be in performing operations upon it.

Having thus premised an account of the anatomy of the parts in which the water in hydrocele is collected, I shall now proceed to consider the different varieties of the disease.

All the varieties of hydrocele which have been mentioned by authors, may, I think, be comprehended under the two following, the anasarcous, and encysted.

In the former, the serum is diffused over all the substance of the part in which it is seated; it is not collected in any particular cavity, but occupies equally all the cells of the part: In that which I term encysted, the water is collected in

one distinct bag, and a fluctuation of a fluid is, in general, perceived in it. The scrotum, with its contents, the testicle and its appendages, are liable to both varieties of the disease ; and the spermatic cord, with its coverings, are also liable to both. We shall first consider those of the scrotum.

SECTION II.

Of the Anasarcous Hydrocele of the Scrotum.

THE scrotum, from its cellular structure, and immediate connection with the trunk of the body, is apt to partake of every diffusible swelling with which the upper part of the body is attacked : and, accordingly, we find, that general anasarcous swellings seldom subsist for any length of time, without

without affecting the scrotum. A local anasarca of the scrotum, is sometimes indeed produced by a local cause, to wit, by the pressure of a tumour on the lymphatics of the part ; by external injuries ; and occasionally by an effusion of urine from a rupture of the urethra : But such occurrences are rare ; a general disease of the constitution being the usual forerunner of these tumours.

As soon as water has collected in any considerable quantity in the scrotum, a soft, inelastic, colourless, tumour, is observed over the whole of it ; impressions are easily received and retained for some time ; the skin at first preserves its natural appearance ; and the rugæ of the scrotum, which, in a state of health, are obvious, are not for some time much altered ; but as the swelling advances, they gradually disappear,

pear, till at last they are totally obliterated : The swelling, from being at first soft, and of a consistence similar to dough, by degrees turns more firm, and the skin at last acquires an unnatural white shining appearance. The tumour at length becomes large ; and although originally confined to the scrotum, it at last spreads up the groin : The penis likewise becomes affected, and often so swelled and distorted, as to excite much inconvenience and distress ; and although the scrotum is composed of parts which readily admit of dilatation, yet, in some instances, the tumour becomes so enormous, as to burst from one end to the other.

These appearances of the disease are so characteristic, as to render it almost impossible to confound this species of hydrocele with any other tumour of the scrotum.

I have

I have already observed, that instances sometimes occur, of the scrotal anasarca being produced by a local cause; but, in a great proportion of cases, it is induced by a general tendency to dropsy: so that the cure will chiefly depend upon the removal of that habit of body, by which it was at first produced.

The treatment of this disease of the system falls to the province of the physician, so that I shall not enter upon it at present; but the aid of surgery is frequently required, for relieving the distress which these tumours always induce when they become large. In these circumstances, the object of surgery is, by drawing off the water, to diminish the size of the tumour, or even to remove it altogether, which not only gives much immediate relief, but is a means of the distended parts recovering their tone

more readily than they otherwise would do. Different methods have been proposed for evacuating the water ; the introduction of a seton, passing a trocar, incisions, and punctures.

All of these, excepting that by the trocar, serve very effectually to evacuate the diffused water ; and therefore we are to adopt that which not only excites least pain, but which is least liable to produce troublesome consequences ; and this unquestionably is the method by punctures.

The seton and long scarifications, may discharge the water more quickly than punctures ; but in dropfical constitutions, such as the anasarcaous hydrocele is commonly connected with, they almost constantly do mischief. For the first two or three days, scarifications give the patient
much

much satisfaction ; the water is almost entirely discharged, the tumor is of course greatly diminished, and much relief is thereby obtained. About this time, however, the scarified parts commonly begin to fester, their edges turn hard and inflamed, and by degrees, an erysipelatous redness spreads over the neighbouring parts.

That fretful uneasiness at first complained of, terminates at last in what the patient terms a burning kind of pain, which frequently becomes so tormenting, as entirely to destroy rest ; and it too commonly happens, that all our applications fail in preventing the accession of gangrene, by which the patient is in general carried off.

I will not say that scarifications always end in this fatal way ; but I have in many instances

instances found that they did so ; and on the contrary, although punctures sometimes terminate in the same manner, they are by no means so ready to do so.

As scarifications are so apt to do harm, there is much reason to suspect that the trocar and seton, which both excite still more irritation, would prove still more hurtful. They are now, accordingly, in the anasarcaous hydrocele very generally laid aside.

When scarifications are to be employed, we make them with the shoulder of a lancet : they should penetrate the cutis vera, but should not be carried to a greater depth, and they should not exceed an inch in length : punctures should be carried to the same depth ; and they, as well

as

as scarifications, should be always on the most prominent part of the tumor : Punctures are best made with the point of a lancet : five or six are commonly sufficient at once ; but as they are apt to heal before the serum is all discharged, they require from time to time to be renewed.

Preserving the parts dry, by a frequent renewal of dry linen cloths, in order to imbibe the moisture, is here a very necessary attention ; indeed, the want of it seems often to be the cause of much of the mischief that ensues from this operation.

When either scarifications or punctures go wrong, by beginning to inflame and turn painful, instead of the warm emollient poultices and fomentations usually employed, a cold saturnine solution applied upon soft linen, not only proves more effectual in putting
a stop

a stop to the inflammation, but affords more immediate relief to the present distress. Lime water, employed in the same manner, proves also an useful application.

Mortification, however, will take place in some instances, notwithstanding all that we can do to prevent it: In this case, we trust chiefly to the internal use of bark, wine, and other tonics, and to warm dressings and other external applications usually employed in gangrene: As this variety of gangrene is almost always accompanied with much irritation in the parts affected, I often give opium with advantage: opium proves chiefly useful, by removing pain and general irritability; but as we know from experiment, that it acts as an antiseptic, it may in some cases stop the progress

gress of gangrene, by acting directly upon the diseased parts.

In a great proportion of cases, the utmost danger is to be dreaded from the punctured parts being attacked with gangrene ; yet, in a few instances, very unexpected cures are obtained, after all the teguments have been destroyed by it. A remarkable instance of this occurred some years ago, in the Royal Infirmary here : The whole scrotum separated, and left the testicles bare. During the time that the fore remained open, all the water collected in other parts of the body was evacuated, and, by the use of large quantities of bark, and mild dressings to the fore, the patient got well. In the course of the cure, the testes became enveloped with a thick cellular substance, which served as a very good means of protection. It must have been
7 some

some similar production, I suppose, which Hildanus speaks of as a regenerated scrotum *.

I have already observed, that, although the anasarcaous hydrocele, for the most part, depends upon a general tendency to dropfy, that some instances, however, occur, of a local cause producing a mere local dropfy of the scrotum. Thus it has, in some instances, arisen from tumors in the groin and abdomen obstructing the passage of the lymphatics. In this case, if the tumors producing the obstruction can be extirpated, no other means will afford such effectual relief; but, when so deeply seated as to render any attempt for removing them unsafe, the practice I have pointed out,

* Observat. Chirurg. Cent. 5. Obs. 76.

out, of making punctures in the most depending part of the tumor, must be employed, from time to time, to palliate the symptoms.

It has sometimes happened, in suppression of urine, whether arising from strictures in the urethra, or from stones impacted in it, that the urethra has burst, and the urine, in this manner, getting access to the cellular texture of the scrotum, an anasarcaous swelling rises immediately over the whole of it; nor does it commonly diminish till the cause by which it is produced is removed.

In order to prevent the formation of sinuses, which, in such circumstances, will otherwise be apt to occur, an incision should be made into the most depending part of the scrotum, and carried to such
a depth

a depth as is sufficient for reaching the wound in the urethra. In this manner, a free vent will not only be given to the urine already diffused, but the farther collection of it may probably be prevented. If a stone impacted in the urethra is found to be the cause of the effusion, it should be cut out ; and, if the obstruction is produced by strictures in the urethra, they must be removed by a proper use of bougies. The cause being thus removed, if the habit of body of the patient is good, and untainted with any venereal or other general affection. by dressing the fore properly, with soft easy applications, the opening into the urethra will probably heal, and a complete cure will, in this manner, be obtained. But when these ailments are complicated with any general affection, particularly with old venereal complaints, it frequently happens, that neither mercury

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ty nor any other medecine has much influence in removing them.

Cases of this kind must have occurred to every practitioner. I have met with them both in the hospital and in private practice ; where, notwithstanding all the means that were employed, the passage from the urethra remained open, and continued to afford a vent to the urine. In such cases, we depend chiefly upon a proper application of bougies.

The scrotal anasarca, of a local nature, has also happened from the rupture of a hydrocele of the tunica vaginalis testis : When the hydrocele of the tunica vaginalis arrives at a great size, jumping from a height, or a violent blow or bruise, will readily burst it ; and the water, not finding a passage outwardly, must necessarily

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diffuse

diffuse itself over the scrotum. Different instances of this have been met with, two of which are related by Douglas *; and different instances of it have fallen within my own observation. A swelling of a similar kind is also sometimes induced by the water of a hydrocele of the tunica vaginalis being improperly drawn off in the operation of tapping. When the orifice in the skin is allowed to recede from the opening into the vaginal coat, before the water is all discharged, as is apt to happen when the operation is done with a lancet, the remainder of the collection diffuses itself through the cellular substance of the scrotum, an inconvenience that may be always prevented, by using a trocar for this operation, instead of a lancet.

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* Treatise on the Hydrocele, by John Douglas, p. 8.

In whatever way the swelling is produced, the cure should consist in laying the tumor sufficiently open, not only for evacuating the diffused serum, but for effecting a radical cure of the hydrocele of the tunica vaginalis.

Some have imagined that danger may ensue from performing the radical cure for the hydrocele in this situation ; but I have done it in different instances, and no harm has ever ensued from it. The patient, in some cases, may decline the operation, and, in others, his habit of body may render it improper ; but, when this does not happen, few will doubt of its being better to give a patient, in such circumstances, immediate and effectual relief, by performing the radical cure at once, than to subject him, in the first instance, to a good deal of confinement, for removing the

diffused swelling of the scrotum, and to leave him under the same necessity as before, of submitting to the radical cure for the hydrocele of the tunica vaginalis.

When, for either of the reasons, however, that I have mentioned, this operation is not to be performed, we endeavour to assist the dissection of the tumor, by suspending the scrotum; confining the patient to a horizontal posture; and by the application of astringents to the parts affected. Of these we have a great variety; but I have found none answer so well as a cold solution of crude sal ammoniac, in the proportion of half an ounce of the salt to a pound of water and two ounces of vinegar; or poultices, prepared with crumb of bread, soaked in equal parts of cold water, vinegar, and brandy.

We have thus considered all the varieties of anasarcaous swellings, to which the scrotum is liable, together with the mode of treatment that appears to be adapted to each : for, with respect to the hydrocele of the dartos, a disease particularly described by ancient writers, as that part of the scrotum is now known to be entirely cellular so any water collected in it must tend to form that very disease we have just been describing, an anasarcaous swelling of the whole scrotum.

We now proceed to consider that species of hydrocele which, from being seated within the cavity of the scrotum, may be termed the encysted hydrocele of the scrotum. Of this there are two varieties, the hydrocele of the tunica vaginalis testis, and that species of tumor formed by water collected in the sac of a hernia.

SECTION III.

Of the Hydrocele of the Tunica Vaginalis Testis.

WHEN treating of the anatomy of these parts, I had occasion to remark, that, in a state of health, an aqueous secretion is always found in the tunica vaginalis; the principal use of which seems to be, to lubricate, and keep the surface of the testicle soft and easy.

In a state of health, this fluid is absorbed by the lymphatics of the part; its place being supplied by a fresh secretion; but, in disease, it frequently happens, either that the secretion of this fluid is morbidly increased, or the powers of the absorbing vessels of the part are diminished.

The

The effect of either of these causes must be, to induce a preternatural collection in the cavity of the vaginal coat ; and thus the variety of hydrocele is produced that we are now to consider.

The symptoms induced by it are these : A soft colourless tumor is at first perceived at the inferior point of the testicle ; it is chiefly remarkable when the patient is erect : it excites no pain, and it does not become less by pressure. The shape of the tumor is at first nearly globular ; it afterwards becomes more pyramidal, being larger below than above : As it advances in size, it becomes proportionally more tense, and the natural rugæ of the scrotum less perceptible. For a considerable time, it does not extend farther than the usual boundaries of the scrotum ; but, on longer continuance, it advances to the abdominal muscles ; so that, although

in the early periods of the disease, the spermatic cord may be distinctly felt; in its more advanced state, it cannot be distinguished.

Before arriving at this height, the weight of the tumor is for the most part considerable, by which the skin of the contiguous parts is dragged so much downwards, as to make the penis shrink considerably, and sometimes disappear almost entirely. In this advanced state of the disease, the testicle, which usually lies at the back part of the tumor, and which, for some time after its commencement, could be distinctly felt, is not now so obviously discovered. On minute examination, however, a hardness may always be felt along that part of the scrotum where the testis is situated; and, at this point, pressure excites some degree of uneasiness.

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In a great proportion of cases, the fluctuation of a fluid is obviously distinguished on pressure. It sometimes happens, however, in that tense state of the tumor, usually produced by a long continuance of the disease, that the fluid contained in it is not evidently discovered: Nor, in this situation, is the ordinary characteristic mark of hydrocele more to be depended on; I mean the transparency of the tumor, when exposed to the light of a candle, or of the sun. In the early stages of the disease, when the contents of the tumor are discoloured, and when the vaginal coat has not yet acquired much thickness, the fluid contained in it, on being exposed to this trial, usually appears transparent; and, in meeting with it, we necessarily consider it as a corroborating proof of the existence of serum. The absence, however, of this, is not a proof of the contrary; for,

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as the transparency of the tumor depends entirely on the nature of its contents, and on the thickness of its coverings, whatever tends to render the one less clear, and the other of a more firm texture, must, in proportion to this effect, invalidate the certainty of the test.

During the whole continuance of the disease, the patient does not complain of pain in the tumor itself; but some uneasiness is commonly felt in the back, by the weight of the swelling on the spermatic cord. This, however, is generally prevented entirely, or at least much alleviated, by the use of a suspensory bandage.

These are the usual appearances of a hydrocele, where the disease is confined to one side of the scrotum. In some instances, however, we meet with a double

hydrocele, when the disease occupies the cavities of both tunicæ vaginales, and in which the tumor, instead of being confined to one side of the scrotum, occupies the whole of it equally.

As there are other diseases with which this variety of hydrocele is sometimes confounded, it is particularly necessary to hold such circumstances in view, as most certainly tend to characterise and distinguish it. These diseases are, all the varieties of scrotal herniæ; the anasarcaous hydrocele of the scrotum; the encysted hydrocele of the spermatic cord; the sarcocoele, or schirrous testicle; and the hernia humeralis, or inflamed testis.

In the hydrocele of the tunica vaginalis, the tumor begins at the bottom of the scrotum, and proceeds slowly upwards. It
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is of a smooth equal surface. In a great proportion of cases the spermatic cord is readily felt at the upper part of it, and the fluctuation of a fluid is distinguished through its whole extent. Pressure does not make the swelling recede, nor is it affected by the posture of the patient, if it be not on its very first approach ; whereas, in hernia, besides pain, sickness, and other affections of the stomach and bowels which commonly take place, the tumor begins in the groin, and only at last proceeds to the scrotum. It has not the pyramidal form of a hydrocele. It is frequently soft and compressible, giving a sensation similar to what we receive from pressure upon dough; but no equal or distinct fluctuation is perceived in it. In most instances, the tumor can be made to recede, either altogether or in part, by moderate pressure, and putting the patient in a horizontal posture; and in

hernia descending to the scrotum, the spermatic cord can never be clearly distinguished.

However improbable it may appear, this variety of hydrocele has, in some instances, been confounded with the anasarous tumor of the scrotum; but the means of distinction are so evident, from the history given above of the two diseases, that it is not here necessary to enter farther upon the subject. It must, indeed, be gross inattention only that can ever make the anasarous hydrocele mistaken for any other disease.

From the encysted hydrocele of the spermatic cord, it may commonly be distinguished by the testicle in the latter being plainly felt at the under part of the tumor; whereas, in this disease, the testis is
feldom

seldom distinctly perceived if it be not at the back part of the tumor. In two cases, I have met with the testicle on the anterior part of a hydrocele ; and, in a third, although fixed behind in its usual situation, it also adhered at one point to the middle and anterior part of the tunica vaginalis. This I suspected to be the effect of inflammation, induced either by hernia humeralis or some other disease. On inquiry, it appeared that the patient at one time had been long confined with inflammation of this testicle, the effect of a bruise.

In the encysted hydrocele of the cord, the tumor first appears above the testicle, and by degrees falls downwards ; while we meet with the reverse in the hydrocele of the tunica vaginalis, in which the tumor at first always forms below, and from thence proceeds upwards.

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In a few cases we find these two varieties of hydrocele existing at the same time in the same patient. In this case the serum, although collected in two distinct cysts, gives the appearance of one uniform tumor; and a fluctuation is distinctly felt from one end of it to the other. But, in any instance that I have seen of this combination, the tumor has been somewhat contracted, having rather a less diameter at that part where the two collections are separated from each other; so that, where this appearance takes place, we may, in general, suspect, that the serum is collected in two distinct bags. This is not always indeed the case, for occasionally I have met with it where the disease was fixed in the tunica vaginalis alone.

The circumstances which most clearly distinguish hydrocele from a schirrous testicle

ticle are these : In the latter the swelling is hard ; it does not yield in any degree to pressure ; the surface of the tumor is commonly rough and unequal ; it is in general attended with a good deal of pain, and is always heavy in proportion to its size : whereas, in hydrocele, the swelling commonly yields to pressure ; its surface is smooth ; little or no pain takes place ; and the tumor is light in proportion to its bulk.

These differences will always serve as a sufficient means of distinction between this species of hydrocele and a pure unmixed sarcocele. But when a scirrhus testicle is combined with an effusion of water into the tunica vaginalis, forming what has very properly been termed a hydro-sarcocele, the means of distinction are not so obvious. In the incipient state of these effusions

effusions the difference between the two diseases is sufficiently apparent ; but, when far advanced, the most attentive observer often finds it difficult, and sometimes impossible, to mark the distinction. In such doubtful cases, however, by proceeding in the cautious manner to be afterwards pointed out, no detriment will occur to the patient from any uncertainty of this kind.

From the hernia humeralis this species of hydrocele is easily distinguished. In the former the tumor succeeds either immediately to some external bruise, or it is evidently the consequence of a gonorrhœa, or of some other inflammatory affection of the urethra *. The skin is more or less

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* The operation of lithotomy is frequently attended with an inflammation of one, and sometimes of

affected with an inflammatory redness; it is attended with a considerable degree of pain, especially on handling, and the swelling is hard and firm, so that no fluctuation is felt in it, unless in its more advanced state, when suppuration sometimes, although rarely, takes place between the scrotum and testicle; in which case the usual symptoms of abscess, particularly the pointing of the tumor, and its being much discoloured, serve to distinguish it sufficiently.

In forming a prognosis of this disease, we must be directed almost entirely by the habit of body of the patient. In a great proportion

of both of the testicles; probably from the inflammation induced by the operation in the neighbourhood of the caput gallinaginis, being communicated along the vas deferens to the testes.

proportion of cases we are to consider it as a local affection ; and, in this state, the most favourable expectations may be formed of the event : for whatever may have been alleged by some, of the hazard of every operation for a radical cure, in a simple unmixed hydrocele, if the constitution is not very unhealthy, it may at all times be advised with a very fair prospect of success.

In the radical cure of the hydrocele, in whatever way it is attempted, some pain will be excited ; the parts will inflame, and of course some degree of fever will take place. In some instances, these symptoms have gone rather farther than was wished for ; but, under the limitations I have mentioned, of an unmixed state of the disease, in a constitution otherwise healthy, the operation I shall presently

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describe,

describe, when properly performed, never fails of the most complete success, while, in no instance, has it ever, in the course of my experience, proved fatal.

But, on the contrary, in constitutions otherwise diseased, in very aged people, and in infirm habits of body, we are by no means to expect such certain success : Even in such circumstances, however, the operation often succeeds. I have, in various instances, performed it under one or other of these disadvantages, and I never knew it fail. Others, however, have found that it has done so : and it may readily be supposed, when practised upon the old, infirm, and diseased, that the symptomatic fever may run too high for the strength of the patient ; and that the suppuration produced by a high degree of inflammation, may afterwards tend to destroy the remains
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of a constitution already greatly impaired. This, however, should not be laid to the account of the operation, but to the impropriety on the part of the surgeon, in advising it in patients already perhaps in danger with other diseases. In such circumstances, no operation should be performed, and the patient should be desired to trust entirely to a proper use of the suspensory bandage.

In judging therefore of the event of a hydrocele, I would say, that in constitutions such as the operation should be advised in, scarcely any danger is to be dreaded; while, on the contrary, in the infirm, and especially in such as are otherwise unhealthy, that some risk will occur from any operation that we can advise, and that the degree of risk will be nearly in proportion to the nature and extent of

that disease with which the constitution is affected.

As long as a hydrocele keeps within moderate limits, patients, in general, rather submit to the inconvenience than undergo the pain of an operation; at least this is commonly the case with people of rank, who can more readily submit to any distress which it excites, than patients of a poorer class, whose labour is frequently impeded by the size of the tumor. At last, however, by its bulk, it excites in all a strong desire to have it removed; for, besides the desire naturally implanted in all to be sound and entire in these parts, the water collected in a hydrocele, is, in some instances, so very considerable, as to be the cause of much inconvenience. When, from timidity, or any other cause, the operation has been too long delayed, I have
known

known the tumor become so large, as laterally to cover a considerable part of each thigh, and extend in length from the groin to the knee.

Various methods have been proposed for the cure of hydrocele. All of these, however, may be reduced to two general heads: such as have in view only a temporary relief, and which is therefore termed the palliative cure; and such as are meant to effect a radical cure, or a final removal of the disease.

Whatever advantages may be experienced from the use of internal medicines, in dropical affections of the constitution, no practitioner, I believe, has so much confidence in remedies of this class, as to expect much advantage from them in encysted dropsy of any kind. We have daily

proofs of their failure in partial hydropic collections, wherever they are seated, and in none do they prove more ineffectual than in the hydrocele.

We are told, indeed, of this disease being cured by different medicines, particularly by the use of drastic purgatives; but, although I have often known them employed, it was never with any advantage, and, when pushed to any extent, they are sure to do harm. As it is always proper, however, to confine the patient to bed for some time after any operation of importance, in order to prevent his being afterwards disturbed, his bowels should be emptied by a purge immediately before any operation for the radical cure of a hydrocele is performed; but this is almost the only way in which purgatives can here prove useful. Internal medicines, therefore, being
found

found ineffectual, and we know of no external applications to be depended upon, we are to seek for that relief from surgery which experience shows it never fails to afford.

When the tumor in the scrotum has become so large as to be inconvenient from its size, if the patient either refuses to submit to the operation for a radical cure, or if his state of health renders that operation improper, in such circumstances, the palliative treatment, or a mere evacuation of the water by puncture, is the only means we can employ.

Two methods are proposed for drawing off the water in this manner ; by the puncture of a lancet, and piercing with a trocar. By some it is alleged, that by the puncture of a lancet the water can neither
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be so completely or so properly drawn off as when the trocar is employed ; for the orifice in the skin being apt to recede from the opening in the vaginal coat, the water is thereby either stopt altogether, or is apt to insinuate into the surrounding parts. By others again, it is said, that the difficulty of introducing the trocar is such as to render it hazardous from the contiguity of the testicle ; and instances are not wanting to show, that, even in the hands of expert surgeons, the testis has been much injured by a trocar reaching it in this operation. Indeed the ordinary triangular form of this instrument makes it both difficult and unsafe to introduce it ; but the trocar, of a flat form, an improvement which I proposed a good many years ago, enters with as much ease as a lancet. This instrument is represented in plate iv. fig. 3. ; and, in plates 1. and 2., other forms

of the trocar are delineated: With any of these, an opening may be made into the tunica vaginalis with perfect safety, and the water with this instrument being much more freely drawn off than by a puncture with a lancet, by which effusions are often produced into the cellular substance of the scrotum; the mode of doing it by the lancet should therefore be laid aside.

The instrument being fixed upon, the next point of importance is the part of the tumor in which the puncture ought to be made. Even in this simple operation, an acquaintance with the anatomy of the parts will appear to be necessary. The testes, as I have endeavoured to show, do not hang loose in their vaginal coats; on the contrary, they are firmly attached behind. Hence at this part, even in the largest hydrocele, no fluid is met with; so that if,
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through ignorance or inattention, the trocar should be inserted here, one instance of which I have seen, the instrument would pierce the body of the testis, while it would not lessen the tumor, as it would not reach the cavity of the vaginal coat in which the fluid is collected. The instrument should be introduced in the anterior and most depending part of the tumor.

The patient being seated in a chair, or on a table, with the scrotum hanging over the edge of it, the operator, with his left hand, should grasp the tumor behind in such a manner as to push the contained fluid as much as possible into the anterior and under part of it. This being done, if a common round trocar is used, a small opening about a quarter of an inch in length should be made through the skin, with the shoulder of a lancet, on that point where the trocar is
to

to enter ; but where a flat trocar is to be used, this precaution of previously dividing the skin is unnecessary. The operator now takes the trocar in his right hand, and having fixed the head of it in the palm of his hand, he places the forefinger along the course of it, leaving as much of the point of the instrument uncovered as may freely penetrate the tunica vaginalis ; and this being pushed in, the filette should be withdrawn immediately on the end of the canula having entered the cyst. The water will now run off ; and, if the tumor is not uncommonly large, it may be all drawn off at once ; but when the swelling is large, as the sudden discharge of the fluid, by taking away too quickly the support which it gave to the vessels of the testis and vaginal coat, might endanger the rupture of some of them, it is better from time to time to stop the flow of it for a

few seconds ; and when the whole is thus evacuated, and the canula withdrawn, a piece of adhesive plaster should be immediately applied to the orifice ; and a compress of soft linen being laid over the scrotum, the whole should be firmly supported, either with a well adapted suspensory, or a proper application of the T bandage*.

The patient being in this state laid in bed, all kind of uneasiness is, in a few minutes, commonly gone, and he goes about his ordinary business without interruption. In a few instances, however, it has happened, either from the external air finding access to the testicle, or from the fore produced

* Some very judicious remarks, on the importance of a due compression in such cases, may be met with in remarks upon this subject, in the works of the late Dr. Monro.

duced by the trocar becoming inflamed; that the whole body of the testicle has been seized with inflammation, by which a radical cure of the disease has been obtained. This, however, is a rare occurrence, and hardly to be looked for.

About four years ago, the public was favoured with some observations on this disease by Mr. Keate of London, in which some cases are related of hydrocele being cured by the external use of a stimulating application, a strong solution of sal ammoniac in vinegar and spirit of wine. The following is the formula employed by Mr. Keate :

R. Sal. ammoniac. in pulv. trit. \mathfrak{z} i.

Acet. spirit. vin. rect. sing. \mathfrak{z} iv.

A quantity of linen cloth, well moistened in this, is desired to be folded round the scrotum,

tum, to be supported with a fufpenfory bag, and renewed three times a day: But, although I have given this method a fair trial in upwards of twenty cafes, in fome while the cyft remained diftended, and in others immediately after the water was drawn off; I have never been fo fortunate as to fucceed. In fome, the application of different ftimulants and aftringents, after the operation of tapping, has appeared to prevent the collection from returning fo quickly as it otherwife might have done; but even this has not been frequent, and in no inftance, in the courfe of my obfervation, has it produced a cure.

With the fame view, I have employed a variety of ftimulants and aftringents, fuch as a volatile liniment, prepared with fix parts of oil, one of camphor, and one of fpirit of hartfhorn; tincture of cantharides; the
fteams

steams of vinegar ; poultices of vinegar and crumb of bread ; and compresses of linen, soaked in brandy: and the practice being neither attended with difficulty or hazard, I mean to continue it till farther experience shows, whether it should be retained or not: That it will often prove successful in removing a hydrocele, by promoting the absorption of the fluid contained in the tunica vaginalis, is scarcely to be expected ; but we may reasonably suppose, that stimulating applications, capable of exciting inflammation in the testes, may accomplish a cure, after the water has been drawn off with a trocar.

Drawing off the water with a trocar, is an operation easily performed; and it very seldom does harm; but when not performed with caution, and especially when the patient is allowed to go about soon af-

ter the water is taken away, it sometimes ends in very troublesome symptoms. If the patient's habit of body is bad, this will happen with whatever attention it may be done. Of this every practitioner may have met with instances, and two are related by Mr. Pott; one of which terminated fatally, and gangrene ensued in the other, which, in a few days, destroyed not only a good deal of the scrotum, but even a considerable portion of the tunica vaginalis*. Both of these, indeed, occurred in very unhealthy constitutions; but it is proper to have it known, that even this operation may, in certain habits of body, be productive of very distressful consequences.

Drawing the water off in this manner, in order to relieve the patient from the
bulk

* Cases xxi. and xxii. Treatise on the Hydrocele.

bulk and weight which it produced, would probably be the first idea that occurred to practitioners in the treatment of the hydrocele; but being found inadequate to the complete removal of the disease, various other methods were afterwards introduced. The actual cautery, and the ligature, were both proposed as means of preventing farther descents of water from the abdomen, which, in former times, was considered as the origin of this disease. Celsus advises the cyst of a hydrocele to be cut away, and many of his followers do the same. Tents, both solid and hollow, were afterwards employed; as was likewise the use of the seton, which we find recommended by Fabricius ab Aquapendente, and other writers, even of a more early period. Various applications, of the caustic kind, have at different times been in vogue: Injecting wine, diluted ardent

spirits, and other irritating liquids, into an opening in the vaginal coat, has been proposed, as a means of inducing a degree of inflammation sufficient for effecting a radical cure; and a simple incision of the cyst, containing the water, has been practised for the same purpose. These are the means which, at different periods, have been employed for the cure of the hydrocele. Ancient practitioners seem to have been acquainted with all of them; but having very inaccurate ideas of the anatomy of the parts concerned, they could not have any fixed or clear opinion of the manner in which any of their remedies acted in effecting a cure. In consequence of this, they were applied at random; and none of them proving at all times successful, the ignorance they laboured under in the theory of the disease, made them frequently propose varieties in the method of cure.

The

The moderns possess one important advantage over the ancients, from knowing that the water in hydrocele is contained in a particular cyst, which has no immediate communication with any other part or cavity of the body, and from finding, that this disease resembles, in many respects, other encysted tumours, with the means of curing which they are well acquainted.

In both situations, the contents of the tumor are secluded from access to the external air. Neither of them have any communication with any other part of the body ; and, although the bag containing the matter of an encysted tumor, is, in some measure, a new formation, yet, in many instances, it is found to be equally firm and elastic with the tunica vaginalis testis.

In the treatment of encysted tumors, practitioners are now agreed, that, besides evacuating the matter, means must be employed for destroying the cavity which contained it, otherwise a return of the collection may be looked for. To accomplish this, different methods have been proposed ; some with a view to destroy entirely the cyst which contained the matter, and others, as it is said, to fill up the cavity, by a formation of new parts.

But we know, that unless the coats of a cyst are much extended, hard, or greatly thickened indeed, that no part of it should be removed. It is also known, that to fill up the cavities of tumours with a formation of new parts, is a mere imaginary matter, being what neither nature or art can do to any extent ; and we likewise know, that the cavity of every tumour
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may be more effectually destroyed by producing an adhesion of its sides, than by any other means.

Parts of the human body, in a state of inflammation, very readily adhere to each other. Indeed, so easily do they do so, that some art is required to prevent the adhesion of contiguous inflamed parts, of which every practitioner must have met with examples. Hence, abscesses and encysted tumours are more easily cured by exciting inflammation over their internal surfaces, after their contents are evacuated, than by any other means; and, in like manner, it is now known, that the hydrocele of the tunica vaginalis may be treated upon the same principles, and with the same general effects.

This is the most simple idea that can be given of the present views of practitioners, in the treatment of this disease ; and I hope it will serve to render their ideas, respecting it, sufficiently clear.

The intention, then, of every means now in use, for the radical cure of this species of hydrocele, is, to induce such a degree of inflammation on the parts in which it is seated, as may tend to obliterate entirely the cavity of the tunica vaginalis, by making it adhere firmly to the tunica albuginea the surface of the testicle.

Some individuals, indeed, still proceed upon the supposition of a total destruction of the sac being necessary for a complete cure. But the extensive experience of many of the best employed surgeons, makes it evident that this is not the case.

When

When the sac has become unusually thick, or hard, it proves sometimes useful to remove those parts of it that are most particularly diseased; and when it has been distended to such a degree as entirely to have lost its tone, removing a part of it may forward the cure, by allowing the scrotum to contract more readily; but it happens so seldom from any of these causes, that I have only met with three instances, in which it appeared necessary to remove any part of it. A cure may indeed be obtained of this variety of hydrocele, by removing the sac entirely; for the contiguous parts from which it is cut away, readily adhere together, so as to destroy the cavity in which the fluid was contained; but what I wish to have understood, is, that we are not to consider it as necessary, as the same end may be obtained by much more lenient measures.

I shall now proceed to speak more particularly of the several means at present most frequently employed by practitioners for effecting a cure, and shall treat most minutely of those now in general use. These are, excision of the tunica vaginalis; the application of caustic; the use of a seton; a simple incision of the sac; and injecting wine and other acrid liquors into the tunica vaginalis, after drawing off the fluid which it contained.

The method of cure, by removing the vaginal coat, which was well known to the ancients, had nearly fallen into disuse, when it was revived by the late Mr. Douglas of London; and by a few practitioners it is still continued. The method of doing it is, first to dissect out an oval piece of the scrotum, which Mr. Douglas considers as always necessary; and having then laid the vaginal
coat

coat open, to cut it away by different snips of a pair of scissars. But, whoever may continue to think favourably of the excision of the sac, will find, that it may be more easily dissected away with a scalpel than with scissars; and it can seldom or never be necessary to remove any portion of the scrotum.

As much danger might ensue from the incision being carried too near to the testicle, all the posterior part of the sac, or that part of it by which the testicle is connected to the scrotum, should be allowed to remain. On the sac being removed, the parts must be dressed, and treated in every other respect, in the same manner as in the operation with the simple incision, to be hereafter described.

The cure by caustic has commonly been conducted as follows: The scrotum being shaved,

shaved, a piece of common paste caustic, properly secured with adhesive plaster, is applied, of about a finger's breadth, the whole length of the tumor; and if, on removing the caustic, it has not penetrated the tunica vaginalis, an opening is made in it with a scalpel, so as to evacuate the contents, lay bare the testicle, and admit of proper dressings.

But Mr. Else, one of the latest writers in favour of the method of cure by caustic, says, that there is no necessity for such an extensive application of caustic as many have recommended; that an eschar, of the size of a shilling, is sufficient; that this may be always fully obtained by the application of caustic paste, of the size of a sixpence, which he directs to be laid upon the anterior and under point of the scrotum, and to be properly secured by adhesive

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five plaster, in order to prevent it from spreading*.

The caustic commonly produces all its effects in the space of five or six hours, and may then be removed. At this time, digestives, or an emollient poultice, must be applied over the scrotum; and the whole properly suspended with a bandage.

Inflammation, Mr. Elfe observes, is soon induced over the whole tunica vaginalis; and the febrile symptoms which succeed, he advises to be kept moderate by bloodletting, injections, emollient poultices, and a low regimen. In a few days, the eschar of the scrotum separates, and comes away; and, in a gradual manner, in the course of four,

* *Vide* An Essay on the cure of the hydrocele of the tunica vaginalis testis, by Mr. Elfe, 2d edit. p. 33.

four, five, or six weeks, the whole tunica vaginalis comes off, when the wound, for the most part, soon heals, and a complete cure is obtained.

In the cure of the hydrocele by the section, the following is the method of applying it, as advised by the late Mr. Pott, who wrote a full and ingenious treatise on the subject: He used a trocar; a silver canula, five inches in length, and of such a diameter as to pass easily through the canula of the trocar; and a probe, six inches and a half long, having, at one end, a fine steel trocar-point, and at the other, an eye, which carries a cord of coarse white sewing silk, of such a thickness as to pass easily through the long canula. With the trocar, the inferior and anterior point of the tumor is to be pierced; and, as soon as the perforator is with-

drawn, and the water discharged, the seton canula is passed through that of the trocar, till it reaches the upper part of the tunica vaginalis, and can be felt in the superior part of the scrotum. This being done, the probe, armed with its seton, is to be conveyed through the latter canula, the vaginal coat and teguments to be pierced with the point of it, and the seton to be drawn through the canula, till a sufficient quantity is brought out at the upper orifice, when both canulas are to be withdrawn, and the operation is finished.

About the end of the third day, the parts begin to inflame; when fomentations, poultices, a suspensory bandage, a temperate regimen, and a lax belly, are ordered, to keep the symptoms moderate. As soon as the parts become easy, by the inflam-

inflammation lessening, which is generally about the tenth or twelfth day, the seton is begun to be diminished, when six or eight threads are withdrawn at every dressing; the dressings, consisting of nothing more than a superficial pledgit upon each orifice, and a discutient cerate, such as the ceratum saturninum, to cover the scrotum.

In the treatment of the hydrocele with a seton, I should wish to follow Mr. Pott's method in every circumstance, but the mode of introducing it, which is rendered unnecessarily complex, by the number of instruments which he recommends. In a former publication, I have described the manner of opening abscesses with a seton, and the directions then given prove equally applicable here*.

Let

* *Vide* Treatise on the theory and management of ulcers, &c., part i.

Let an opening be made with a scalpel, or the sharp pointed bistoury, plate 1. fig. 2. in the superior part of the tumor, large enough to admit, with ease, a cord, consisting of about thirty threads of common white sewing silk. A director, with an eye at one end, in which the cord is inserted, is to be introduced at this opening ; and its farther extremity being carried down to the most depending part of the tumor, an opening is there to be made, of about half an inch in length, by cutting upon the director with the bistoury. The director being now drawn down, till a sufficient quantity of silk is left hanging out below, the operation is in this manner finished. In every other respect, the management of the seton should be the same with the method described above from Mr. Pott ; or, instead of introducing the cord with a director,

it may be done with a silver canula and perforator, represented in plate iii. fig. 1. 2. & 4.

By making the first opening in the upper part of the tumor, the instrument conducting the seton is more easily introduced along the course of it, than when the first opening is made below; for, in this case, the tumor remains distended to the last: whereas, when opened below, the contents rush out immediately; and the vaginal coat collapses so much about the testicle, that I have seen a good deal of difficulty in getting the instrument insinuated between them, by which the testis has, in different instances, been injured; and, by making the under opening half an inch long, any matter which forms in the course of the cure is easily and readily discharged: whereas, in Mr. Pott's method of operating, where the opening is

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is not larger than the size of the trocar, as this is completely filled by the cord, the matter is thereby allowed to collect; an incision becomes necessary, to discharge it; and thus the patient is exposed to pain and disappointment, as I have seen in various instances, where the precaution I have mentioned has been omitted, of making the opening at the most depending part of the tumor sufficiently large for discharging any matter that may form.

Before entering farther into the consideration of the method of cure by the scrotum, I shall proceed to describe the operation for a radical cure, by incision.

The patient being laid upon a table of convenient height, and properly secured by assistants, with the scrotum lying nearly on the edge of the table, the operator, with one

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hand,

hand, should grasp the tumor behind, so as to hold it firm, and make it somewhat tense on the anterior part of it: With a common round-edged scalpel in the other, he should now divide the external teguments by one continued incision from the upper end of the tumor, all along its anterior surface, down to the most depending point of it.

If the incision has been properly made, the divided scrotum will retract, and the tunica vaginalis will be laid bare, for the breadth of about half an inch, from one end to the other. An opening is now to be made in the vaginal coat, with a sharp pointed bistoury, just at the upper end of the tumor, where the first incision commenced. This opening should be of such a size, as freely to receive the finger of the operator; which, being inserted, the bistoury

toury is to be conducted upon it, and the sac divided to the very bottom, directly in the course of the first incision. By the previous division of the skin, with the scalpel, instead of the bistoury, the operation is done with more accuracy, and less pain; for the scalpel, from its convexity, admits of a finer edge than an instrument of any other form is capable of receiving, and hence it cuts with more ease.

By making the incision of the teguments and tunica vaginalis together, as in some instances I have seen done, the operation may be somewhat shortened; but the time gained by it is not more than two or three seconds, while the incision is apt to be ragged and unequal: for when done in this manner, particularly when the opening is made at the under extremity of the

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tumor, as some have advised, the parts cannot be kept sufficiently tense during the time of making it.

I have desired that the first opening in the vaginal coat may be so large, as easily to receive the finger of the operator, which ought to be pushed in behind the bistoury, without withdrawing the instrument, as is commonly done. In this manner, we shorten the operation, and, by giving a free vent to the fluid contained in the sac, we prevent it from spreading and forming vesications in the cellular substance of the vaginal coat, and contiguous parts, as it is apt to do when the opening in the sac is too small. By making the first opening in the upper end of the sac, much trouble and inconvenience is prevented, which always occur from making it below. For, as I have before re-
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marked, when the tumor is first opened below, the water is instantly discharged; and, as this is followed by an immediate collapse of the the tunica vaginalis, the direction in which it should be cut is not afterwards easily discovered: whereas, by making the first opening above, as the water is thereby gradually emptied as the opening is carried downwards, the vaginal coat continues distended at the bottom, till the operation is finished.

With a view to save some pain to the patient, the late Mr. Hunter advised the incision both of the scrotum and tunica vaginalis, to be only two-thirds of the length of the tumor; and others have thought even that one half of this is sufficient. But the difference of pain between incisions of these different lengths is inconsiderable, and not to be regarded,

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when compared with the effects which result from them. When the incision is carried the full length of the tumor, the operation will succeed, perhaps, in every instance, if the subsequent part of the treatment meets with due attention; whereas, I have known various instances of these partial openings being followed with a return of the disease.

It is particularly proper to carry the incision of the tunica vaginalis, down to the most depending point of the tumor; otherwise, in the first instance, the contents of the sac will not be completely discharged, while room will be given for collections of matter during the cure. It is also proper to remark, that, in making this incision of the sac, it ought to terminate at some distance from the testis; for I have, in different instances, observed, where the vaginal coat has been divided
near

near to the testicle, that the inflammation was particularly severe.

The incision being completed, the testicle, covered with its tunica albugina, is brought fully in view. In some instances, the testis protrudes from the surrounding parts; in which case, it should be immediately replaced, and covered as quickly as possible from the air; and if no part of the tunica vaginalis is to be removed, the dressing may be finished directly on the sac being opened.

Unless the sac is diseased, or, so much distended as entirely to have lost its tone, no part of it, as I have observed above, should be removed: but when hardened to the firmness of cartilage, as I have more than once seen, as, in this state, it is apt to excite pain when applied to the tender surface of the testis, it ought to be removed;

ed ; and as, in this state, it commonly separates with ease from the surrounding cellular substance, it is easily and quickly cut away with a scalpel or bistoury. The removal of any portion of the sac from the mere enlargement of the tumor, can seldom be necessary ; not once in fifty instances.

Hitherto we have been supposing that the disease is confined to one side of the scrotum ; but, in some instances, as I have remarked above, we meet with a hydrocele in both sides at once. In this case, the common practice is, to do the operation twice in all its parts, both in the scrotum and tunica vaginalis, by laying each collection open, from top to bottom, by a double incision. Some advise both operations to be done at the same time ; but, in general, practitioners are afraid of too much inflammation being induced by this ;

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so that one side is commonly allowed to heal before the other is opened. In this manner, the patient is exposed to delay, uncertainty, and to the confinement the consequence of two operations.

This, however, is not necessary, as the operation may be done on both sides at once, with little more pain, and, so far as I have seen, with no more hazard, than in the usual method of doing them separately. The method in which I have done it is this:

After finishing the operation on one side, an opening is made into the vaginal coat of the opposite testicle, at the upper extremity, through the septum scroti; and the incision being carried down to the bottom of the tumor, the cyst is thus equally well laid open, the water is as completely evacuated, and the disease is not more liable

liable to return, than by doing the operation, in the usual manner, and at different times.

Whether the hydrocele is double, or confined to one side, as soon as the incision is finished, if the testis is found, the wound should be quickly dressed ; and, I think it right to observe, that, on the manner in which this is done, much of the success of the operation at all times depends, more indeed than is commonly imagined.

If the vaginal coat is merely wrapped about the testicle, without the interposition of dressings, or if the divided sides of it are immediately united with futures, as some have advised, partial adhesions are apt to take place, before a degree of inflammation is produced over the whole, sufficient for rendering the cure complete. In
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this manner, cavities are left, which either fill with pus during the cure, and require to be laid open, or they afterwards give rise to collections of water, and thus occasion a return of the disease, different instances of which have fallen within my observation. And again, the practice of stuffing the cavity of the scrotum with dressings, is also a frequent cause of mischief. By rubbing, or pressing upon the surface of the testis, such a degree of inflammation is sometimes induced, as excites much pain, inflammation, and fever. But this is almost always the fault of the operator; for, in a great proportion of cases, if the dressings are properly managed, no symptoms of violence ever occur.

After having tried various ways of dressing the parts, the method I have now long pursued, and which, in no instance I have found

found to fail, is this : The testicle being properly placed in the newly divided sac, two pieces of soft old linen, exactly the length of the cut, previously dipped in a liniment of wax and oil, are by the help of a probe, inserted to the bottom of the sac, one on each side of the testicle; between it and the vaginal coat, care being taken to leave a sufficient quantity of each pledgit hanging out of the wound; to admit of its being easily withdrawn at the first or second dressing; otherwise, if the swelling, which afterwards takes place, shall be considerable, they may, for some days, be entirely covered, and even at last removed with difficulty, as I have seen in different instances where this piece of attention has been omitted.

If the testicle has pushed forward, and is with difficulty retained in its situation,

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as it will be apt to slip out between the lips of the wound between one dressing and another, no means should be omitted that can, with safety, be employed for preventing it, as it cannot afterwards be so easily replaced ; and, from want of attention to this, I have known the testicle entirely extruded from the scrotum, and, in one instance, from sufficient pains not being taken to replace it, the cure was completed with the testis in this situation ; when, instead of being covered with the vaginal coat and scrotum, it was covered with scarf skin only.

The best method of preventing such a misfortune, is, to draw the edges of the divided tunica vaginalis and scrotum nearly together, after the testis has been properly placed, and the pledgits of oiled linen inserted ; and, in this situation, to secure

cure them, either with a couple of futures, at proper distances from each other, or with slips of plaster, sufficiently adhesive for retaining them.

This being done, the whole scrotum is covered with a large pledgit of saturnine cerate, or common wax ointment, by which the parts are kept much more soft and easy, than when covered, in the usual way, with dry lint, at the same time that the dressings are much more easily removed. A cushion of soft tow, with a proper compress, is placed over the pledgit of ointment, and the whole are retained by the T bandage, or common suspensory bag. The patient is now carried to bed: a quieting draught should be given; and he should be enjoined to remain as much as possible in the same posture; for much
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motion at this period certainly does mischief.

The intention of this operation being to induce a moderate degree of inflammation in the tunica vaginalis and surface of the testicle, if the pain, inflammation, and swelling, which, in some degree, always succeed, do not run to a great height, nothing is to be done for the first two or three days after the operation; but, when these symptoms become violent, and especially when much fever is induced, means must be employed to lessen or remove them.

The remedies we chiefly depend on, are, bloodletting, gentle laxatives, a low cooling diet, and warm emollient poultices and fomentations to the part in order to forward a plentiful suppuration, which commonly tends to moderate every bad symptom more effectually than any other remedy.

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By these means, the inflammation is easily kept within proper bounds ; but where the mode of dressing I have pointed out is adopted, they will very rarely be required. In upwards of fifty cases, in which I have done the operation in this manner, I have only once found it necessary to advise bloodletting, and very rarely, fomentations or poultices.

In most cases, the inflammation of the testicle does not rise higher than it does in the simple hernia humoralis from gonorrhœa ; and it gradually subsides as the suppuration advances. The abatement of the inflammation is also assisted by continuing a cool diet, the occasional use of opiates and keeping the belly open.

Often in two days, and always by the end of the third, I remove all the dressings,

sings, except the pledgits inserted between the testis and tunica vaginalis. This is one important advantage we derive from covering large sores with pledgits of ointment. The dressings are easily removed at any period ; so that, without waiting for a plentiful suppuration, as is commonly done, the patient may, at any time, be relieved from that distressful uneasiness, of which all those complain, in whom the first dressings are several days in being taken away. They are always rendered stiff and uncomfortable, by the blood discharged upon them after the operation ; and the matter at first secreted being thin and acrid, I have, in various instances, seen, when the dressings have not been removed for six or seven days, and in some cases even in less, that the whole contiguous parts have been excoriated by the acrimony of the matter alone, and by which more uneasiness has

been induced during the course of the cure, than by any circumstance connected with the operation : Nay, in some, the inflammation induced in this manner has an obvious influence on that of the testicle, and tends to render it much more severe than it otherwise would be.

On some occasions, at the first dressing, and always at the second or third, the pledgits inserted between the tunica vaginalis and testicle come away ; and, whenever this happens, they should be renewed. It is also proper to renew them daily, for the first fourteen or fifteen days after the operation ; not, however, of the same depth as the first, as, during the latter part of the cure, it proves sufficient, if they are merely inserted so far as to prevent the divided edges of the tunica vaginalis from adhering to the testicle before the adhesive process

process has taken place in the parts more deeply seated. To this point, I must observe, the most particular attention is necessary ; for, when this mode of operating fails, that is, when the disease returns, it is, almost in every instance, from this precaution being overlooked. In my own practice, the disease has not returned in a single instance ; but I have met with different cases in which it has done so, and in all from the cause I have mentioned, viz. the divided edges of the tunica vaginalis being allowed to adhere to the testicle before adhesion had taken place between the parts more deeply seated.

In almost every circumstance, the treatment of hydrocele by this operation is the same with what answers best in a common abscess. After opening an abscess, if the lips of the newly divided parts are allow-

ed too early to adhere, either to each other, or to the parts beneath, the operation will most probably fall to be renewed, as matter will thus be allowed to collect, by which the patient will be nearly in the same situation as before; while all manner of risk of this is prevented, by the cut being kept open till the sides of the abscess adhere to each other. In like manner, we never fail in the cure of hydrocele, if the external cut is kept open, not till the cavity of the tunica vaginalis fills up with granulations, as some have imagined to be necessary in this mode of operating, but merely till such a degree of inflammation is induced upon the testicle and vaginal coat, as terminates in their adhesion to each other.

This idea of the whole cavity of parts in this situation being to fill with new granulations, has been held out by some

as an objection to this operation; and as many believe that it actually happens, I have judged it proper to speak of it more particularly than those will consider as necessary, who have been accustomed to operate in this manner. No such process takes place; instead of it, the testicle and vaginal coat, soon after the operation, become inflamed; till the sixth or seventh day, the inflammation continues gradually to increase, till the whole tumor, as I have observed above, has acquired the usual size and appearance of a common hernia humoralis from gonorrhœa. About this period, the tunica vaginalis is found to adhere to the testis, over all the posterior and lateral parts of the tumor, and on the slips of oiled linen being gradually lessened, and at last withdrawn, by the fourteenth or fifteenth day, or soon thereafter, the adhesion becomes complete; the tumor of the testis gradual-

ly subsides, and the sore produced by the cut, and now reduced to a line, heals in a shorter or longer time, according to the habit of body, age, and other circumstances of the patient. In some, the cure is complete in three weeks; I have known it in less; while, in others, it runs on to the fourth, fifth, and, in a few cases, to the sixth week.

Having thus given an account of the different operations usually employed for the radical cure of the hydrocele, I shall now make a few observations on the comparative advantages of the three last, viz. those by caustic, the seton, and the simple incision; one or other of these being now commonly practised for the removal of this disease,

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From the testimony of many respectable authors of the efficacy of each of these, there is no reason to doubt that any of them would, in most instances, prove effectual ; that the caustic, when properly managed, will, for the most part, succeed, we have every reason to believe ; and the same may be safely asserted both of the seton, and the simple incision ; but every practitioner being apt to be prejudiced in favours of a particular method, he generally continues to practise that mode, and no other ; and finding it commonly succeeds, he by degrees comes to persuade himself, that other methods of cure, with which he has not had such opportunities of becoming acquainted, are liable to objections, which those who have practised them do not find to be the case.

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I attended the hospitals in London, about the time that Mr. Pott's publication on the seton, and Mr. Else's treatise on the cure of the hydrocele by caustic, were published; when, of course, the various means of curing the disease were frequently the subject of medical conversation. I was thereby induced to pay much attention to the subject; and having the advantage of seeing the practice of different hospitals, and not being particularly biased in favours of any particular method, I was thus furnished with the best opportunity that could be wished for of forming an opinion: And the result of all the observation I was either at that time able to make, or since that period, both in the hospital here, and in private practice, is, that although all the three modes of operating, by caustic, the seton, and simple incision, are perhaps equally capable of producing a radical

dical cure ; yet, that of the three, the latter, viz. the mode by the simple incision, is liable to fewest objections, and effects a cure both with least trouble to the operator, and least risk to the patient : and, of the other two, the treatment by caustic appears to me to be the best.

I have seen all the three produce troublesome symptoms, such as, pain, and tension of the abdomen, inflammation, and fever ; but, from much observation, I can, without hesitation, say, that the seton is more frequently productive of these than either of the others : And we need not wonder at this being the case ; for the cord which is here introduced, lying in close contact with the body of the testis, must necessarily occasion a considerable and continued irritation, as long as it remains applied to it.

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The seton is likewise attended with other inconveniences, to which neither of the others, when properly managed, are liable. When the inflammation, which succeeds to the introduction of the cord, runs high, as it frequently does, it commonly terminates in such a plentiful suppuration, that the matter produced by it cannot be readily discharged at the opening made for the seton. In consequence of this, it finds access to the neighbouring parts; and different abscesses are accordingly formed, which must all be discharged by as many openings. This may, in part, be obviated, by making the inferior opening the size I have directed; but, in some instances, I have found even that this has not proved altogether effectual, owing to the opening being reduced in size by the swelling and inflammation of the tumor.

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Another objection to this operation, which I think of importance, is this: It does not admit of a free examination, either of the state of the testicle, or of the fluid contained in the sac. I know that, in a simple uncomplicated hydrocele, the state of the testicle requires no examination; nor would we think of removing it, either on account of a mere enlargement, or diminution of its size, provided it is not otherwise diseased. But we know well, that cases sometimes occur, which elude the utmost skill and penetration of the surgeon; no diagnostic symptoms, with which we are yet acquainted, being sufficient to direct us with absolute certainty.

The most experienced practitioner will admit, that, at times, he has been mistaken in his opinion respecting the na-

ture of such tumors ; a real farcocele, or schirrous testicle, attended with some effusion of a fluid, being, in some instances, mistaken for a pure unmixed hydrocele ; and, vice versa, a simple uncomplicated case of hydrocele has been mistaken for, and treated as a schirrous testicle. Such occurrences every practitioner must have met with ; and, among others, who confess their having been deceived in this manner, a very candid acknowledgement is made of it by Mr. Pott * ; and
Mr.

* Treatise on the hydrocele, p. 288. In this case, which, from every circumstance, had been considered as a farcocele, the testis, after being removed, was found to be perfectly sound, the disease being a real hydrocele of the tunica vaginalis.

There being even a possibility only of such an occurrence with such an attentive observer as Mr. Pott,

Mr. Elfe takes notice of a fimilar occurrence in which he was concerned.

I have been concerned in different cafes, where the moft experienced furgeons were at a lofs to determine the real nature of the difeafe; that is, whether the fwelling in the fcrotum was a fimple hydrocele of the vaginal coat, or an effufion of a fluid into that bag produced by a fchirrous tefticle. In all fuch cafes of doubt, the furgeon fhould proceed as if the tumor was a real farcocele. If, on laying open the fwelling, the tefticle is found difeafed, that is, if it is in fuch a ftate as to require extirpation, it fhould be removed

Pott, ought to ferve as a moft convincing argument with practitioners in general, of the neceffity of proceeding with the utmoft caution in all fuch cafes, where there is the leaft caufe for doubt.

removed immediately ; while, on the contrary, if it appears to be found, he will treat it as a case of simple hydrocele.

In several instances of this kind, where, by different practitioners, a mere collection of water was expected without any other affection, the testicle has been found to be so much diseased, as to render immediate extirpation proper. Now, if in such circumstances a cure had been attempted by the seton, the testicle would have been allowed to remain exposed to the irritation produced by the cord, which probably would have induced very troublesome and even alarming symptoms ; for we know that every symptom of a schirrous tumor, is uniformly rendered worse by irritation.

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It has indeed been alleged, that the real state of the testis may be always known, by drawing the water off from the tunica vaginalis with a trocar; and this has accordingly been recommended as a previous step to the introduction of the seton, with a view to ascertain the situation of the testicle. But it often happens, even after all the water is drawn off, that the thickness produced by the vaginal coat and scrotum collapsing in large folds about the testis, precludes effectually every accurate examination of this kind. Of this, where the tumor has been large, every practitioner must have met with instances; and we need not be surpris'd at its being so, when it is known that instances occur, in which it requires a good deal of experience to determine, whether a testicle is so much diseas'd as to require extirpation, even when completely laid bare in the

common operation for the hydrocele. Of this I have known several cases in which a difference of opinion occurred, even among surgeons of observation ; and among these, the most remarkable happened in an operation performed by a late very eminent surgeon. The case was supposed to be a scirrhous testicle, connected with the effusion of a considerable quantity of a fluid into the tunica vaginalis. On laying open the tumor, the testicle was found enlarged and hard ; but being neither painful nor unequal on the surface, the operator thought it improper to remove it : The surgeons present were of a different opinion ; but the event of the case, which was favourable, tended to evince the superior judgment of the operator, although, previous to the operation, he had entertained a very different opinion.

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I have also observed above, that, when the seton is used, the contents of the cyst cannot be properly ascertained. It sometimes happens, as will be more particularly noticed in the next section, that a portion of gut is contained in the upper part of a hydrocele. Of this I have met with several cases, in some of which, no suspicion was entertained of it, till the sac was laid open, although in two of them the water had previously been drawn off with a trocar.

In other instances, the water of a hydrocele is contained in hydatids*; a circumstance which cannot be discovered previous to the opening of the tumor: And

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* Those who doubt of the existence of hydatids in cases of hydrocele, as some have done, will find different instances of them recorded in Morgagni de causis et sedibus Morborum.

as it will be readily admitted, that the method of cure by seton, is ill suited for discharging hydatids, this of itself is a material objection to the practice. So that, although the seton, in every other respect, should be equally eligible with the simple incision, which, for the reasons formerly given, I think it is not, yet the three last objections I have adduced against it, seem to be sufficient reasons for setting it aside.

With respect to the mode of treatment with caustic, I have only to observe, in addition to what has already been said upon it, that where patients are naturally timid, and do not incline to submit to the operation by the knife, this may be put in practice.

But the method of cure by caustic is liable to one important objection, which never

ver attends the cure by incision, viz, that of being productive of sinuses, and collections of matter in the scrotum and cellular substance connecting that bag to the tunica vaginalis. Two instances of this I have seen, in which it was necessary to discharge collections of matter by different openings; and a remarkable case of it is related by Douglas, in which an extensive incision became necessary for removing the collected matter*. For this reason, therefore, and as the method of cure by incision brings the state of the testicle more completely into view, and especially as, from all the experience I have had of the two different modes of operating, that by incision seems to produce the least troublesome symptoms, I am decidedly of opinion that it should be preferred.

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In points of such importance, no person should form any opinion hastily. Nothing but various opportunities of putting the different operations in practice, can enable any one to judge of the merits of each. Even in the writings of the late celebrated Mr. Sharpe, we find a remarkable instance of this. In his treatise on the operations of surgery, he speaks of the radical cure of hydrocele, whether by caustic or incision, or in whatever way it may be attempted, as a very dangerous operation, and seems to think that it will be entirely laid aside *.

At that time, it is evident, Mr. Sharpe's experience in this disease, had not been sufficient to warrant a decisive opinion. It
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* Tenth Edition, chap. ix.

proved to be contrary to the direct experience of some of our best surgeons ; and Mr. Sharpe himself, seems afterwards to have been convinced that his first ideas respecting the mode of operating by the simple incision, had been ill founded *. Still however, his first opinion had much influence with a great proportion of surgeons ; so that, till of late years, the radical cure of hydrocele was seldom attempted but in large hospitals : and when at last it was found that the danger attending it was less than had been represented, yet the terror induced by Mr. Sharpe's account of the mode of operating by incision, was such, that almost all who wrote upon it, were afraid of advising it to be so generally performed as it ought to be.

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* *Vide* Critical Inquiry, First Edition, p. 86.

When the earlier editions of my System of Surgery were published, although I gave the same opinion of this operation that I have now done, and of the preference to which it appeared to be entitled, and although my experience of its utility and safety had at that time been considerable, yet, finding it spoken of with much caution by many, and among others by Mr. Pott, I did not venture to recommend it so warmly for general use, as I am now by much additional experience enabled to do. Although I had performed the operation, in a great number of cases, without losing a patient, yet, as in some the inflammation came to a considerable height, I was afraid that in others, the dreadful accounts that were given of it by authors might occasionally be realized. This induced me not only to speak of it with caution, but to endeavour, if possible, to discover the cause of
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the violence of this symptom ; for it obviously appeared, not merely from my own observation, but from all the accounts which had been given of this operation, that the danger attending it was always in proportion to the degree of inflammation, and therefore, if this could be rendered moderate, that little or perhaps no hazard, would attend it.

I did not find that the length of the incision had much influence ; for, whether it was to the full extent of the tumor, or only to one third of that length, the inflammation appeared to be the same. Some advantage, indeed, was derived from attending to the direction of the incision ; for, wherever it was carried too near the testicle, as is sometimes done at the bottom of the sac, the pain and inflammation were always severe ; but the most frequent

frequent cause of the violence of these symptoms appeared at last to be the mode of dressing the parts after the operation. Till of late years, it had been the practice to cram a considerable quantity of dressings into the cavity of the tunica vaginalis; and, with a view to make the surface of the parts slough quickly off, a process which at that time was judged necessary for the cure, red precipitate, and other irritating substances, were made use of by many. The impropriety of these being obvious, dry lint was, by Mr. Pott and others, proposed to be used instead of them. This was an important improvement, and it tended more than any other circumstance to lessen the dread that had been conceived of this operation by the writings of Mr. Sharpe. Still, however, the inflammation run, in many instances, too high; the parts swelled to a great size, and

and the patient, for the first two or three weeks of his confinement, was often kept in much distress and anxiety.

Having frequently found, that the dry lint, inserted into the tunica vaginalis, adhered, at the first dressing of the parts, so firmly to the surface of the testis, that it could not be withdrawn, I at last began to conclude, that this might render the inflammation more severe than it otherwise would be ; and it soon appeared that my conjecture was well founded. For several years past, I have covered the pledgits applied to the surface of the testis, as has been advised above, either with fine oil, or with a thin liniment of oil and wax, which answers better. This gives much less pain, in the first instance, than dry lint, and the pledgits never adhere to the contiguous parts ; so that they can be as easily removed

removed at the first dressing of the fore, as at any future period of the cure.

The effect of this, and of proceeding in the other parts of the treatment, in the manner I have mentioned, has been, that, during all this period, the inflammation has never gone farther than I could have wished it to do; never so far as to excite the least cause of anxiety. The testicle swells and inflames, but in no greater degree than is necessary for preventing a return of the disease. Of this, the clearest proof that can be given, is, that, of the last sixty patients on whom I have operated in this manner, I have only once found it necessary to advise bloodletting; and very rarely, as I have formerly observed, fomentations or poultices.

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I may farther mention one important advantage of this operation, in addition to what I have said of it, that it may be considered as an absolute security against a return of the disease. I have known, indeed, two instances, and I have heard of other two, in which the disease returned after this operation was performed. But these are all the instances I can hear of its failure, in the course of these last twenty years ; and, in all of them, the cause was evidently traced to want of that persevering attention during the cure, so necessary for the success of every operation, and particularly for that of the hydrocele.

That this operation is not hazardous, and that it may with confidence be relied on against future returns of the disease, I am warranted in asserting, not only from
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the universal success attending it in this country with others, but from the success arising from it in my own practice.

Almost every operation that had been proposed for the cure of hydrocele, had, by one or other of our surgeons, got a fair trial ; viz. that by incision, or cutting away the greatest part of the tunica vaginalis ; by injecting wines and other liquids into the cavity of the sac ; by irritation, excited with tents of various kinds, both solid and hollow ; and more lately by the seton. But, however keenly one and all of these methods had for a time been supported by those who first introduced them, they were at last entirely laid aside ; so that, for these last twenty years, scarcely any has been attempted through the greatest part, or perhaps the whole of Scotland, but that by incision : and although, as I have
observed

observed above, I have been able to trace a return of the disease in four instances, not one, so far as I know, has died of the operation.

I have now performed this operation in one hundred and sixty-five cases, and in every variety of age, from the third to the seventy-fifth year : not one of the number has either died or been in danger ; nor has the disease returned in any of them. In various instances, at first, the inflammation, as I have observed above, arrived at a considerable height ; but not in a single instance, since the operation has been done in the manner I have mentioned.

I have therefore reason to think, that the objections which have been made to this operation will soon be done away, and that the more it is put in practice, the less

less dread will be entertained of it. For my own part, I now consider it as a matter of nearly the same simplicity as the treatment of a common abscess in any part of the body. The cure is conducted upon the same principles. It is accomplished in the same time ; often in less than the cure of abscesses of equal magnitude ; and, from the event, I am warranted to say, that it is not attended with more hazard.

Others, from not being so fortunate, and with whom a high degree of inflammation was often induced, not conceiving that this inconvenience could be lessened, either by any alteration to be made in the mode of performing the operation, or in the management of the dressings, were naturally induced to make trial of other means of obtaining a radical cure of the disease.

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The late Mr. James Rae of this place, who was, perhaps, one of the best informed practitioners, as I believe him to have been one of the best operators of the age, was, I believe, the first who revived the use of the seton in this kingdom for the cure of the hydrocele. He, as well as Mr. Pott, who afterwards wrote upon it, having, from the causes I have mentioned, conceived a dread of the mode of operating by the simple incision; and Mr. Rae having previously made many unsuccessful trials of the method of cure by injecting wine and other liquids into the tunica vaginalis testis, they both keenly adopted the practice with the seton. Being strongly recommended by two surgeons of reputation, it was at first adopted by others; but the inflammation induced by it was found, in some instances, to be so great and alarming, and the distress arising

ing from matter collecting within the tunica vaginalis, and from the openings necessary for the discharge of it, was so considerable, that the practice never got into general use ; and it now appears to be laid aside even by those, who, at one period, had formed the most favourable opinion of it. I have not heard of its being performed, in a single instance, in this place, for these ten or twelve years. It now seems to be falling into disuse in England ; and although, in some parts of the Continent, it was at first adopted, on the recommendation of Mr. Pott, I do not now learn that it is ever attempted.

About the same period that Mr. Pott wrote upon the use of the seton, the late Mr. Else began to revive, with some improvements, the method of curing the hydrocele

cele by the application of caustic ; and, if any sufficient reason had occurred for laying aside the operation by the simple incision, I would have been of opinion that the method of cure recommended by Mr. Else should have been preferred to every other with which we are yet acquainted. It gives much less pain than the seton, and it cures the disease with equal certainty:

It cannot be compared to the method of cure by excision, that is, by cutting away the tunica vaginalis, which does not accomplish a cure more quickly, nor with more certainty, than the simple incision, while it obviously renders the operation much more tedious and more painful ; the chief reasons, no doubt, for this mode of operating being now very generally exploded:

The last variety of operation that has been recommended for the cure of hydrocele, is also the revival of an old one, viz. the injecting of wine and other liquids into the tunica vaginalis testis.

The merit of first proposing the cure of this disease by injections, has commonly been given to a Mr. Monro, a surgeon of this country ; but we now have evidence of the practice having been proposed and adopted, upwards of fifty years before. Tents, armed with irritating ointments, having long been employed, we need not wonder at injections being considered as a better method of conducting the same remedies to the parts upon which they were to act. Whether injections were earlier used for this purpose or not, we do not certainly know ; but in 1677, there is a third edition, of what is intitled *Les Oeuvres Chirurgicales*,

gicales, of a Monsieur Lambert at Marfeilles, in which a particular account is given of the method of curing hydrocele by injections. The liquid Mr. Lambert preferred, was a strong solution of corrosive sublimate, in lime water ; and he enumerates many cases in which it proved successful. But whether from the pain which it excited being severe, or for other reasons with which we are not acquainted, this mode of operating appears to have been for a long time laid entirely aside, till it was afterwards practised by Mr. Munro. Mr. Munro at first made use of spirit of wine ; but although it cured the disease the pain which it excited was so severe, that he immediately laid it aside, and employed wine instead of it.

The practice being favourably received by some of the first surgeons of this place,

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particularly

particularly by the late Dr. Monro, Mr. Douglass, Mr. Lauder, and the late Mr. Ræ, it was for some time frequently practised, especially by Mr. Douglass and Mr. Ræ. The liquids they employed were, diluted spirit of wine, lime water, a solution of alum, and red wine, both by itself and diluted.

But however favourably they were at first induced to judge of the practice, and although very anxious for its success, it was, in the course of a few years, laid aside by all of them, and evidently upon good grounds. The injection either excited severe pain, on being first thrown in, and was succeeded by violent inflammation, and this, in some, by distressful collections of matter; or the cure did not prove permanent. In a few cases, the disease returned almost immediately, that is, in the course of two or three weeks; but this was not frequent.

frequent. For the most part, the cure appeared to be complete, and continued to be so, till at some distant period, to the great disappointment both of the patient and surgeon, a recurrence of the swelling was observed. In some, this happened in five or six months; in others, not till three or four years had elapsed.

About the same period, some unsuccessful trials being made with injections in London, both by the late Mr. Sharpe and others, the practice was altogether laid aside there, as it had been here, till of late that some attempts have been made to revive it.

But although, for a period of more than forty years, this operation was scarcely heard of in Britain, it was frequently practised in France, and other parts of the

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Continent,

Continent, where many trials and experiments were made for curing the hydrocele by injections. Trials were made with spirit of wine, both by itself, and diluted with water ; with a solution of common caustic in water, in the proportion of two grains to the ounce ; with blue vitriol in water, in the same proportions ; with lime water, both by itself, and with mercurius sublimatus corrosivus, dissolved in it in various proportions, from a quarter of a grain to two grains, to the ounce ; with strong solutions of alum, of saccharum saturni, infusions of red rose leaves, infusions of oak bark, and with red wine, both by itself, and reduced with water to various degrees of strength, according to the fancy of the operator.

Many give the preference to an infusion of red rose leaves : others make use of the corrosive sublimate ; but it requires, even when much diluted, to be used with great caution.

caution. In general, the preference is given to wine: when claret or burgundy are employed, they are commonly mixed with a sixth or seventh part of water; and when port is used, a third or fourth part of water is added. Where no pain is excited by the injection thus diluted, the liquid should be discharged, and pure wine thrown in; for where no pain takes place, a cure is not to be looked for.

The operation is done in different ways; some preferring a lancet for making the opening into the tumor, and others injecting the liquid with a common syringe; but in my opinion, the best method of performing it is the following:

The surgeon should be provided with a flat trocar, of the form and size represented in plate iv. fig. 3. together with a bag
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of *resina elastica*, fitted with a pipe, represented in the same plate, fig. 1. The pipe should be somewhat longer than the canula of the trocar, so as to pass about an eighth part of an inch beyond it. If longer than this, it might injure the testis; and when shorter, the liquid does not pass so easily. The quantity of liquid to be injected should be gently warmed, and put into the bag before the operation is begun. The patient being laid in a horizontal posture, either upon his bed or on a table, and secured in the usual way by assistants, the water should be drawn entirely off from the tumor, by passing the trocar into the anterior, and most depending part of it. The operator, securing the canula of the trocar with his left hand, is now, with his right, to pass the tube of the injection bag entirely through it, and with gentle pressure, to force as much of the liquid

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which

which it contains into the cavity of the tunica vaginalis, as may be necessary for easily reaching every part of it, as well as the whole surface of the testis. The bag should now be removed, taking care to leave the tube within the canula of the trocar, so that, by turning the stop-cock, the liquid may be retained in the cavity of the tumor. The surgeon should still keep the canula of the trocar fixed, otherwise it might recede, by which the liquid would insinuate into the cellular substance of the scrotum, and in this manner do mischief. He should also, with very gentle pressure, make the liquid pass to every part of the cavity, during the time it is retained in it; and, at the end of four minutes, it should be entirely discharged through the canula of the trocar, after withdrawing the tube of the elastic bag.

Some

Some have said that the injection should be retained about three minutes: Others think that it cannot be depended on in less than six or seven. But those who have operated most frequently in this manner, are of opinion, that the space of four minutes is better than either. It sometimes happens, that intense pain is given almost instantaneously on the injection being introduced. In this case, it should be discharged as soon as it has been made to pass to the different parts of the tunica vaginalis.

Some again are of opinion, that, after the quantity of liquid first injected is discharged, a similar quantity should be immediately thrown in, and retained for the same length of time, and that the operation will be very apt to fail, if this is omitted. This, however, is seldom done, although, I believe, it would be a real improvement on the operation.

The quantity of liquid to be injected, should always depend on the size of the tumor. Some have thought that it should be equal to the quantity drawn off by the operation; but this does not appear to be necessary, while the injecting of such a quantity is very apt to do harm. After having collapsed completely, the parts do not again yield easily to sudden distension; so that very violent pain has been induced by it. Where the tumor is small, that is, where only five or six ounces of serum is collected, the quantity of injection need not exceed three or four ounces; while it should not be less than seven or eight ounces, where a pound of serum has been drawn off; and in this proportion, according to the size of the tumor.

Less than any of these quantities might answer; but it would require more handling

ling to bring it into contact with all the parts which it ought to touch ; and, as a larger quantity is easily introduced, it should always be advised.

On the injection being discharged, and not a drop should be left, the scrotum should be covered with a pledgit of common cerate, a short compress being applied over it, and retained with a suspensory bag. The patient should be desired to remain in bed for several days, and to give aid to the suspensory bandage, by inserting a small pillow beneath it.

It often happens, that the pain is considerable from the first : Scarcely any inflammation or tumor is perceived on the testis ; and the patient, considering himself as well, walks abroad, in ten, twelve, fourteen, or fifteen days. But, with others, a very severe degree of pain takes place on
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the first introduction of the injection, not merely in the testis, but in the back, and over the whole loins. In most instances, this soon becomes moderate, and the treatment goes easily on ; but, in others, it is succeeded by great inflammation in the testis and scrotum ; and, in a few, this terminates in collections of matter within the cavity of the tunica vaginalis.

These violent symptoms the practitioner endeavours to obviate by bloodletting, a low diet, the use of laxatives, and all the remedies usually employed in *hernia humoralis* ; such as the saturnine applications, and warm emollient fomentations and poultices, when suppuration is likely to take place.

When matter forms in the tunica vaginalis, the treatment consists in laying the collection open from one end to the other,
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and conducting the cure, as has already been advised in the operation by the simple incision. The formation of matter, I believe, is not frequent ; but I know that it occasionally happens ; and so much are the practitioners on the Continent afraid of it ; of the height to which the inflammation might otherwise advance ; and of the dreadful distress that in such circumstances, ensue, from suppuration taking place, that they seldom perform the operation without premising purging and bloodletting, and often repeat the bloodletting once and again during the cure, precautions never judged necessary in the method of curing the hydrocele by the simple incision.

The proportion of those that are completely cured by this method of operating, it is difficult to ascertain ; for, although in some the disease returns in the course of two or three weeks, in others, it is not
perceived

perceived for several months ; and, in some, as I have observed above, not till two or three years have elapsed. Hence, in hospital practice, where patients are seldom heard of after being dismissed, the point in question cannot be determined ; and it is chiefly in foreign hospitals that hitherto this operation has been performed. From the best information that I have been able to procure, it appears, that, although, in many, a complete cure is obtained, yet that the disease returns early, that is, in the space of a few weeks, in a ninth or tenth part of all on whom the operation is performed ; and in five of eight or nine, at some uncertain period in future.

Under this conviction, I have judged it proper to state all that has come to my knowledge of what relates to this operation ; and I am the more induced to it, from finding that others, either from an

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unnecessary dread of the operation by the simple incision, and which I consider as the best and most rational that is yet known, or from a misrepresentation in the accounts they may have received of the method of cure by injection, are again endeavouring to introduce it in Britain.

From the history that I have given of the method of curing the hydrocele by injections, the conclusion that I have formed of it would readily be drawn by any one; but, in addition to this, many powerful arguments may be adduced against it.

1st, We do not, from experience, find, that other tumors, produced by fluids contained in cysts, are readily cured by injections. Few, I believe, would now think

think of attempting the cure of abscesses or encysted tumors by injections. In tumors produced by fluids collected in the bursæ mucosæ, where, from the contiguity of joints, extensive incisions might have done harm, I have, in various instances, made trial of injections; but seldom with any advantage. In some, they excite pain and inflammation; and where this does not happen, although they may lessen the discharge, this proves only temporary; so that a cure is afterwards to be obtained by the introduction of a cord, or the enlargement of the opening to as great an extent as with safety can be ventured upon.

Mr. Earle, indeed, has said, and he gives it as a reason for the practice he has adopted in hydrocele, that he has *frequently* succeeded in procuring an adhesion and

consolidation of parts in sinuses *and other large cavities*, by injections of various kinds : But, as this has neither happened in the course of my own experience, nor with any other practitioner with whom I am acquainted, I must leave the practice in the hands of those with whom it has answered better.

At one period, a practitioner in this country got into notice by announcing frequent cures of the fistula in ano. as well as other sinuses, by injections. Some timid patients, both here and from England, put themselves under his care. His reputation, however, was not of long duration ; for I do not find that he proved successful in one of twenty cases, although the patients commonly remained long under his care. The injections were thrown in frequently, and with much attention ;
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and liquids of various kinds were employed; some that seemed to act solely by their astringency, and others by exciting inflammation.

2d, When the tunica vaginalis has been much distended, as it will not collapse equally round the testicle on the fluid being drawn off, cavities will thus be formed, by which separate collections will take place, either of a serous fluid, or of purulent matter if inflammation has been excited.

3d, When inflammation excited by an injection goes too far, and with whatever care the operation is done this sometimes happens, the distress produced by it is severe. Besides the pain arising from the inflammatory stage of the disease, if supuration takes place, the patient must submit to that painful distension which the

sudden formation of matter in this confined state always excites; to the febrile symptoms with which it is attended; and to an incision equally extensive for discharging the matter, as if the mode of cure by incision had been adopted at first.

4th, The state of the testis cannot, in this mode of operating, be examined with the same accuracy, as when the operation is done by incision. Hence it may be in such a state of disease as to be injured by the injection, without our being previously able to discover it.

Some indeed have said, that, on the water being drawn off, we may always know with certainty whether the testicle is found or not. This, when it is much enlarged, we easily distinguish; but, where

the tunica vaginalis is thickened, as it generally is when it has been long much distended, the testis, if not considerably enlarged, as well as the epididymis, may be materially diseased, without our being able to discover it. Of this I have seen various instances, in some of which, as I have observed above, practitioners of much experience were deceived.

5th, The views of modern surgeons in the cure of the hydrocele, are, as I have already had occasion to remark, to excite such a degree of inflammation over the surface of the testicle, as well as of the tunica vaginalis, as may produce a firm adhesion between them.

Now, instances often occur, in which the tunica vaginalis is so thick, callous, and insensible, that a much more irritat-

ing injection would be required to make it inflame than the testicle itself can bear.

Nay, cases are sometimes met with, in which different portions of the tunica vaginalis are as firm and hard as cartilage ; a state highly improper for any attempt to cure the disease by injections, or in any other way than by removing the hardened parts ; and yet this sometimes happens, as I have more than once seen, where previously it could not be discovered, and in which the tunica vaginalis testis appeared to be in its usual state, till the contrary was found to be the case, on laying the parts open by the simple incision.

6th, The chief, and perhaps only advantage which the mode of operating by injection seems to possess, over that by incision, is, that it is less painful in the execution ;

cution ; but although this may be a reason for advising it with timid patients, who will not submit to the other, it is not sufficient to warrant practitioners, in giving it the preference. The prevention of pain is at all times a most desirable object ; but it is far from being the only one in surgical operations. Our chief view, is the safety of our patient in the first instance, together with his complete security against a return of the disease. In so far as one mode of operating is less painful than another, and attended with equal certainty in securing against a relapse, it ought certainly to be preferred ; but this is, as I have already had occasion to remark, far from being the case with the mode of curing the hydrocele by injections : So that patients treated in this manner, are, for a considerable time, liable to all the distress and anxiety, which uncertainty in points of impor-

tance in every instance gives, while the chief difference between it and the method of operating by incision, which I have shewn to be attended with complete safety as well as security, consists in the degree of pain which it excites being less. This of itself would have little influence even with the most timid, were they to know, that, in the mode of operating by incision, the cutting part of it is done in less than a minute ; when the dressings are properly conducted, that the testicle does not inflame more than is necessary for a cure ; and that the subsequent pain is for the most part inconsiderable ; not to be compared with what is experienced from matter collecting within the cavity of the tunica vaginalis, as sometimes happens in the mode of operating by injection, as well as in that by the seton,

7th, As an argument in favour of this operation, it is said, that, when it fails, we still have it in our power to perform it over again, or to advise the radical cure by incision. This, however, leads to much vexation, distress, and disappointment in the first instance, while I think it probable, that one effect of injections, when they do not succeed, must be, to render any other operation that may be afterwards performed, more uncertain than it otherwise would be, or to require a higher degree of inflammation to be induced. Some have imagined, that injections in the cure of hydrocele prove useful only in so far as they excite inflammation, and consequent adhesion of the tunica vaginalis to the surface of the testis; whilst others are of opinion, that they act solely by their astringency. By strengthening or corrugating the secreting and absorbent vessels of the parts, they
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may be supposed to act both by preventing a too plentiful secretion of the fluid naturally contained in the tunica vaginalis, and by promoting a more equal absorption ; and we accordingly find, that such fluids only are now used for these injections, as are obviously of an astringent nature, such as infusions of red rose leaves, solutions of alum, and red wine.

My own opinion is, that a permanent cure is never to be depended on, where inflammation is not induced sufficient to produce a firm adhesion between the tunica vaginalis and testicle ; but there is reason to think, that this seldom takes place from injections ; and I conclude that it is so, not only from the trifling degree of pain, which, in most instances, the injections now used, commonly give, and from the swelling of the parts which usually
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takes place, being inconsiderable, but from the disease often returning, after it had been supposed to be cured, and which could not happen, if these parts had been made to unite by inflammation.

Now, if this is the fact, and I firmly believe it to be so, that injections, in a great proportion of cases, act chiefly by their astringency, and not by destroying the cavity of the tunica vaginalis, they may readily be supposed to render not only the tunica vaginalis, but even the surface of the testis, more callous than it was before, by which a greater degree of inflammation will be required than might otherwise be sufficient, when any other operation becomes necessary for the cure of the disease,

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In answer, however, to all these objections, it may be said, that the practice has already gained ground in several parts of the Continent, and that Mr. Earle, a surgeon of our own country, has brought forth two publications on the subject, in both of which, it is recommended in the warmest manner, and a number of cases recited in which it appears to have proved successful.

To this I shall only observe, what I have already had occasion to do, respecting the practice of foreigners, in the hydrocele; that having been later than the British surgeons, in acquiring a knowledge of the true nature of the disease, they have hitherto remained behind them in every thing that relates to it. Their practice has therefore, been timid, changeable, and indecisive. This, however, I only mean as a general observation; for some foreigners there are,
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whose knowledge in this, as in all other diseases, would do them much honour · but all who have read what in general has been written upon this subject by foreign surgeons, or who have had opportunities of seeing their practice, must admit, that, in this disease at least, they ought not to be followed.

And again, with respect to the observations of Mr. Earle, I need only observe, that this writer obviously labours under a deep rooted prejudice against every mode of operating, except that by the seton, of which he once seems to have entertained a very high opinion; and the mode of cure by injection, which he has now very keenly adopted. In one part, indeed, of his treatise, he makes the following candid declaration. “ I must confess, that I
“ took *an early and deep rooted* dislike to the
“ cure

“cure of hydrocele by incision*.” Labouring under this kind of terror at other operations, and disappointed, as it would seem, in his expectation of the operation by the seton, he was thus ready to adopt the practice of curing the disease with injections, in the easy manner represented by the French, and which he has accordingly, with great zeal done.

If longer experience, and farther improvement, shall evince the mode of curing the hydrocele by injections, to be equally safe and certain with that by the simple incision, and shall obviate the objections that I have stated against it, none will be more ready to adopt it than I shall be. In the mean while, and in the present

* *Vide* A treatise on the hydrocele, &c. by James Earle, Esq.—p. 30.

sent state of our knowledge, few practitioners will advise it, if it be not with those patients, whose timidity precludes the more certain and equally safe method of cure, the operation by incision.

SECTION IV.

Of the Hydrocele of a Hernial Sac.

WHEN the parts have been long protruded in hernia, a serous fluid collects in the bottom of the sac. In the scrotal hernia, if this extravasated serum is not soon removed by absorption, the tumor, we may easily imagine, may augment to such

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a size as to afford many of the usual marks of a hydrocele. Accordingly, besides different instances that I have now met of it, in my own practice, a number of cases, I find, are enumerated by authors, which sufficiently warrant the insertion of this as a real, and perhaps not an unfrequent variety of the disease.

It was well known to the ancients, that a considerable quantity of a fluid is frequently contained in the sac of a hernia, along with the parts protruded from the abdomen ; but Saviard seems to have been the first who speaks of it with precision. Le Dran relates different cases of it : Heister speaks of it under the title of Hydro-entrocele : And the late Dr. Monro describes it with his usual accuracy ; and mentions a case of it, where six pounds of water were evacuated from the tumour, by an
opening

opening made with a trocar *. A case of it is also related by Douglass †, and two cases of a similar nature are mentioned by Mr. Pott ‡.

The water is here confined in a cyst, formed by a process of the peritoneum; and, as it occupies nearly the same situation in the scrotum with the hydrocele of the tunica vaginalis, so we cannot always, by the feeling alone, mark the difference between them. For, although the testicle, in this variety of hydrocele, is commonly distinguished more evidently at the lower and posterior part of the swelling, than in the hydrocele of the vaginal coat,

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* Monro's Works, p. 579.

† P. 182.

‡ Treatise on the Hydrocele, p. 21.

yet, the difference in this particular between the two diseases, is not always so evident as to afford a sufficient distinction.

When a portion of gut, and other parts forming the hernia are down, the fulness they produce along the spermatic cord, serves, in some measure, to distinguish the disease from a simple hydrocele. And when, along with this and other symptoms of hernia, we evidently discover, in the tumor of the scrotum, a fluctuation of a fluid, if this fluid can, by pressure, be made to disappear, either entirely or in part, the nature of the case is thereby rendered obvious.

This variety of hydrocele may take place as readily in the hernia congenita, as in any other rupture; and, in that event,
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the water must be contained in the same sac with the testicle and protruded intestines.

As all the fluid indeed naturally secreted for keeping the surface of the abdominal viscera moist, must, in a congenital hernia, fall into the sac, we would be induced to suppose, that almost every hernia of this kind should be complicated with a hydrocele of the sac. The two cases of this related by Mr. Pott appear to have been connected with hernia congenita; and I have met with it in two instances. But whether this commonly happens or not, farther observation must discover.

With whatever hernia this kind of hydrocele may be connected, if the water can, by pressure, be made to pass into the

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abdomen,

abdomen, this will always prove a certain characteristic of the disease; for, in no other species of encysted hydrocele, can the water be made to disappear by pressure. It may happen, however, in this kind of hydrocele, that this distinguishing symptom of the disease does not exist; for if, by the pressure of a truss, or any other cause, an adhesion is produced in the groin, between the sides of the hernial sac, if the under part of the sac continues open, with water collected in it, the tumor produced by it will afford all the usual appearances of hydrocele, while no part of its contents can be made to pass into the abdomen by pressure. A case of this kind we find related by Le Dran, where the neck of the hernial sac was shut completely, and a hydrocele formed in the under part of it.

In this situation, the chief means of distinction are to be obtained from an acquaintance with the previous history of the case. When, in an ambiguous case, it is found, that, before the water began to collect in the scrotum, the patient had been liable to a hernia of the same side, this circumstance alone will tend much to determine the nature of the disease. But, even although a mistake should occur, and although a hydrocele of a hernial sac, in such circumstances, should be mistaken for a simple hydrocele of the tunica vaginalis, nothing bad could ensue from it; for the treatment adapted to one species of the disease, would apply with nearly equal propriety to the other; for here we conclude, that the parts which at first formed the hernia are reduced, and that the sides of the sac, in the upper part of it, adhere firmly together.

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But, when the protruded parts still remain down, unless the operation for the bubonocoele is at the same time to be performed, no other should be attempted, but that of discharging the water with a small trocar, when the size of the tumor renders it proper. For, unless the operation for the hernia should be done at the same time, much mischief might ensue from exposing the bowels so much to the air, as would necessarily be the case, by laying the tumor open for a radical cure of the hydrocele.

Whenever it is resolved, in this variety of hydrocele, to operate for a radical cure, the simple incision ought unquestionably to be advised; as, from the risk of injuring the bowels, or other parts protruded from the abdomen, neither the seton, caustic, nor injections, are here admissible. Indeed,
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this of itself, affords a powerful argument in favour of the method of operating in every instance by the simple incision, which brings all the parts concerned in the disease into view. The very possibility of a patient being killed, by a seton passing through a portion of intestine contained in a hydrocele, is a weighty objection against the seton being ever employed; and every practitioner must acknowledge, that when the spermatic process along the groin is much distended, and when the vaginal coat of the testis is much thickened, that such uncertainty often occurs, as to render it impossible for the most skilful surgeons to determine with precision, what the contents of such swellings really are. In the two instances to which I allude, of a hydrocele connected with a congenital hernia, and which I met with some years ago, there had not been previously,

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in either of them, any cause to suspect the real nature of the case. They were both by skilful practitioners. judged to be collections of water in the tunica vaginalis, without any complication whatever ; and in each of them, on the tumor being laid open, together with water in contact with the testicle, a piece of intestine was found protruded into the upper part of the scrotum. In one of the cases too, a small portion of omentum accompanied the gut.

In this last, it had been proposed, at a consultation of surgeons, to employ the seton. For some reason or other, this was fortunately rejected ; for, on laying the tumor open by incision, it evidently appeared, that if a cord had been introduced, it must in all probability have passed through the protruded gut.

SECTION V.

Of the Anasarcous Hydrocele of the Spermatic Cord.

IN the anatomical description given in the first section, it was observed, that soon after the descent of the testis, the passage along the spermatic process of the peritoneum, is completely obliterated, by the sides of the passage adhering to each other by means of cellular substance.

By external pressure, and in some instances, perhaps, from other causes, this adhesion of the sides of the peritoneal process, is in general very firm in that part of it which passes along the groin ; but the
superior

superior and more internal part of the process, is not only more loose in itself, but is connected with, and enveloped in a very loose cellular substance.

From this cellular structure of these parts, we might, *a priori*, suppose them to be liable to the same kind of anasaruous or œdematous swellings, with which other parts of the body, of a similar structure, are frequently attacked. And accordingly, we find this to be the case. This anasaruous swelling sometimes accompanies ascites; and it now and then appears as a local affection, without being combined with either of these.

The causes of this variety of hydrocele in general, are obstructions produced in the lymphatics leading from the part, by scirrhus affections of the liver, spleen, and
other

other abdominal viscera. I have likewise known it induced by the pressure of a truss applied for the cure of a hernia *.

When the swelling is connected with anasarca in other parts, it is thereby so distinctly marked, as to render a particular description of it unnecessary. When it takes place as a local disease, its appearances are these: A colourless tumor in the course of the spermatic cord; soft and inelastic to the feel, and not attended with fluctuation. In an erect posture, it is of an oblong figure, but when the body is in a recumbant posture, it becomes more flat, and somewhat round. It does not commonly occupy more than the usual stretch of the cord along the groin, but
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* An instance of this is also mentioned by Douglass. Treatise on the hydrocele.

occasionally, it extends down the length of the testicle, and even stretches the scrotum to an enormous size *.

By pressure, the swelling can be always made to recede, never entirely, but often in great part, into the cavity of the abdomen. It instantly, however, returns to occupy its former situation on the pressure being withdrawn.

When the tumor is connected with general anasarca, unless the cause which gave rise to the disease of the constitution is removed, it would be a vain attempt to endeavour to cure this particular symptom.

And

* A remarkable instance of this, is related by Mr. Pott, who, from a swelling of this kind, discharged eleven English pints at once. Treatise on hydrocele, case x.

And it commonly happens, that these swellings in the groin which occur in anasarca, disappear when the disease of the system is carried off.

But when the swelling occurs as an original disease, produced, perhaps, by some local cause ; a local remedy is then the only one necessary to be employed. In such a case, as we have not the general bad habit of body to encounter, which commonly occurs in cases of scrotal anasarca, we need not be so much afraid of making a free incision into the tumor ; and accordingly, all that is necessary to be done is this : As soon as the swelling has acquired such a size as to become inconvenient, an incision should be made with a scalpel from one end of it to the other, taking care to go so deep, as effectually to discharge all the fluid contained in the cells
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of the part; and as the serum is sometimes found to have acquired a viscid consistence, this circumstance renders a deep incision more necessary than it otherwise would be. In making this incision, the only circumstance we have to guard against, is injuring what may be properly termed the constituent parts of the spermatic cord, the spermatic artery and vein, and vas deferens, and which, in every instance, may always with certainty be done.

The contents of the swelling being all removed, a pledgit of soft old linen, spread with common wax ointment, should be inserted between the lips of the sore, which must afterwards be treated, in every respect, as a simple wound from any other cause; by poultices and fomentations, if much pain and a scanty suppuration, render

der these remedies necessary ; and by a due attention to dressing, so as to induce the formation of firm granulations from the bottom.

In some instances, a cure has been attempted by making deep punctures in different parts of the swelling ; but while they do not with such certainty remove the disease, they are equally painful with an incision carried the full length of the tumor.

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SECTION

SECTION VI.

Of the Encysted Hydrocele of the Spermatic Cord.

THE surrounding substance of the spermatic cord being entirely cellular, the formation of encysted tumors, we may conclude, ought occasionally, to take place here, as well as in other parts of the body; and accordingly we find, in some instances, that water, instead of diffusing itself over the whole spermatic process, is collected in one or more distinct cells or cysts.

This kind of hydrocele being on its first appearance small, gives little or no trouble,

trouble, and is therefore, seldom much noticed, till it has acquired a larger size. In some, it begins in the superior part of the process; but in general, it is first perceived towards the lower part of it, a little above the epididymis. By degrees, however, it stretches upwards, and, in some instances, so far downwards, as to reach from the abdominal muscles to the very bottom of the scrotum; in which case, a person who had not formerly seen the disease, might probably mistake it for a hydrocele of the tunica vaginalis. But we have a very certain mark of distinction between the two diseases.

In the commencement of this variety of hydrocele, the tumor is always above the testicle, which is distinctly felt below; and even in the the most advanced stages of

the disease, the testis is found at the back part of it, perfectly unconnected with the swelling. Whereas, in the advanced state of a hydrocele of the tunica vaginalis, although some degree of hardness is discovered, where the tunica vaginalis adheres to the testicle, yet when the swelling is considerable, the testis can never be distinctly felt. In the encysted hydrocele of the cord, the figure and size of the penis, is not commonly so much altered, as when the water is collected in the tunica vaginalis, in which the penis frequently disappears almost entirely:

In other points, the encysted dropfy of the spermatic cord, is very similar to the hydrocele of the tunica vaginalis testis. A fluctuation of a fluid, is sensibly discovered on pressure. The tumor is commonly

monly of a pyramidal form, which is also the case with the other, with its base or largest extremity downward *. And no pressure has any influence in making it disappear, either altogether or in part.

This is the appearance of the tumor, when the water is contained in one cyst. When separated into two distinct cells, as sometimes happens, the line of division is commonly evident by the tumor being at that part somewhat puckered, or diminished in its diameter. A similar appear-

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* A hydrocele of the tunica vaginalis testis, is so frequently indeed of a pyramidal form, with its base downwards, that this shape may be considered as one of the characteristic appearances of the disease; every other tumor to which the testis and its coats are liable, being either more round, or of a more irregular shape.

ance also takes place, when this variety of hydrocele is combined with a real hydrocele of the tunica vaginalis testis, which, in some instances, happens; and in this case, a line of separation may be observed, where the upper extremity of the tunica vaginalis terminates.

The means of distinction between this species of hydrocele, and that of the vaginal coat of the testis, have already been mentioned. The only other tumors with which it is in danger of being confounded, are, the anasarcaous hydrocele of the spermatic cord, and a real hernia, either of the omentum, or of a portion of gut. From the former, however, as also from an omental hernia, it may in general be distinguished by the feel. In neither of these, is the fluctuation of a fluid to be perceived, and to the touch they are both
soft

soft and inelastic ; whereas, in this variety of hydrocele, the tumour has a springy kind of feel, and a fluctuation is sensibly found in it. And in both the others, the swelling in some degree recedes upon pressure, which it never does in this variety of encysted hydrocele.

From a rupture of a portion of gut, it is chiefly distinguished by the tumor beginning, not at the ring of the external oblique muscle, as is the case in hernia, but farther down the cord. In the latter, the swelling commonly turns less, on the patient being placed in a horizontal posture ; and it is always considerably affected both by coughing and sneezing ; but no posture, no pressure, nor any accidental circumstance, alters the size of this variety of hydrocele. The absence of the symptoms of hernia, too, is here material in the distinction. For there

is neither pain in the tumor, nor in the abdomen; nor sickness, vomiting, nor any interruption to the passage by stool, as very commonly happens in hernia.

Although all the ancient writers were ignorant of the anatomy of the parts concerned in this disease, it is evident they were well aware of its existence. We find it particularly described by Ægineta, Albucasis, and afterwards by Fallopius, Wiseman, and others. Arnaud, in his treatise on herniæ, also takes notice of it, though not with much accuracy; and we find it more lately described with exactness, by the late Dr. Monro, by Douglass, and by Mr. Pott.

This variety of hydrocele, as also the anasarcaous swelling of the cord, and the œdematous tumour of the scrotum, are all frequent

frequent in infancy. These tumors, however, in childhood, seldom prove permanent. For the most part, they readily yield to gentle friction with volatile liniment, or any other stimulating or astringent application ; such as spirit of wine, a strong solution of allum in water, or of crude sal ammoniac in vinegar. The late Dr. Monro advises the application of cloths warmed with the fumes of burning benzoin.

Even the hydrocele of the tunica vaginalis is sometimes met with early in life. I have had different instances of it in children under three years of age ; but it is not so readily acted upon by the external application of stimulants, as the anasarcaous varieties of the disease.

In adults, indeed, the cyst in every variety of hydrocele generally becomes so
firm,

firm, as not to be affected by any external application ; so that, when the tumor becomes large, we employ either the means for a palliative, or a radical cure, as have been already recommended in the hydrocele of the tunica vaginalis testis.

When it is our intention merely to discharge the water by a puncture, it should be done with a trocar, in the same manner as was directed in section fourth, for a hydrocele of the tunica vaginalis ; taking care to introduce the instrument at the most depending part of the tumor. And again, when we mean to accomplish a radical cure, the same means are to be employed, that have been already advised for the radical cure of that variety of the disease, in the tunica vaginalis testis. The same objections indeed do not here occur to the use of the seton, as in the hydrocele

cele of the tunica vaginalis, from the presence of the testis. And if we could, in every species of hydrocele, ascertain the exact contents of the tumor, the seton might, no doubt, be here employed with safety and advantage. But, as it is obvious, from what I have already had occasion to remark, that no certainty of this can at all times be obtained; and, as a hydrocele of a hernial sac, in which a portion of gut is contained, may be as readily confounded with this as with any other species of the disease, I would therefore, even in the hydrocele of the cord, lay this method of cure entirely aside.

An objection occurs, in this variety of the disease, to the method of cure by caustic, which is not applicable in the hydrocele of the tunica vaginalis testis. The
serum,

serum, in some instances, is collected in two or more cysts; different cases of which I have met with, and similar instances are related by Garengeot, Douglass, and others. Now, in this situation, if caustic should be applied in the method recommended by Mr. Else, upon a small spot only, all the water would not be discharged; and, in order to obtain a complete removal of the disease, it would be necessary to repeat the application of the caustic.

This, I think, is an additional reason for our giving a general preference to the method of cure by incision; which, by laying the tumor open from one end to the other, divides at once all the different cysts of which it may be composed, and saves the patient from that distress and disappointment which must always be experienced,

rienced, on a complete cure not being obtained, when good reasons had been previously given for expecting it. I would therefore advise the treatment by incision in this species of hydrocele, in the same manner as in the hydrocele of the tunica vaginalis ; and the mode of performing the operation, and the after treatment of the patient, are nearly the same in each.

I have thus enumerated every hydrocele that can be properly considered as forming a distinct variety of the disease. In doing so, as I have described no tumor but such as every practitioner of experience must have met with, and of which the symptoms are clearly and distinctly marked, so it will not, I hope, be considered as an unnecessary degree of minuteness, that I have particularly taken notice of them all.

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I can by no means agree with some authors, particularly with Mr. Sharpe * and Mr. Elfe, who think that it might be better to confine the description of hydrocele to two varieties. We need not indeed wonder at Mr. Sharpe speaking in this manner; for, even at the late period in which he wrote, although the existence of all the varieties of the disease that I have mentioned had been described by different authors, yet they were not understood with much accuracy; and it is evident from Mr. Sharpe's writings on the subject, that his ideas of them were in many respects more confused than might have been expected in one of his usual accuracy and penetration. But, whatever was the case with Mr. Sharpe, it is

* Treatise on the operations of surgery:

is truly surprising, that those who are unquestionably well informed in every circumstance relating to this disease, and who must be convinced, from frequent dissections, of the existence of all the varieties that have been mentioned, should object to their being retained. Where no evident or marked distinction occurs between one tumor and another, an attempt to establish a difference would be useless, and therefore improper; but where appearances point out an obvious variety, it would surely be considered as much want of accuracy in an author to omit the detail of them.

In the description I have given of the five different species of hydrocele, viz. the anasarous swelling of the scrotum, the hydrocele of the tunica vaginalis testis, the hydrocele of the hernial sac, the
anasarous

anasarcous and the encysted hydrocele of the spermatic cord, it was necessary to enumerate the symptoms of each, as they occur separately and uncombined. It sometimes happens, however, that one, two, or more of the different species occur at the same time in the same patient. I have met with instances of three, and not unfrequently with two varieties in the same person. The late Dr. Monro mentions an instance of four species of hydrocele being all combined in one case *.

In such cases, some difficulty and confusion is, no doubt, to be expected; but practitioners, in forming a judgment of their nature, must be entirely directed by due attention to the various symptoms which

* *Vide* Monro's Works, 4to, p. 576.

which take place in each variety of the disease, when met with separately, and unconnected with others.

We now proceed to the consideration of the other varieties of false hernia; and first of the hæmatocele.

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CHAPTER

CHAPTER II.

ON THE HÆMATOCELE.

THE hæmatocele is a tumor in the scrotum or spermatic cord, produced by extravasated blood.

The usual seat of this disease is in the tunica vaginalis of the testis; but, in some instances, it is seated in the spermatic process, and occasionally it is met with in the dartos.

This kind of tumor always originates from the rupture or division of one or more
blood

blood vessels, and it is most frequently the effect of external violence. Blows upon the scrotum, and bruises received in riding, frequently burst the veins, not only in the cellular substance of the scrotum, but in the vaginal coat of the testicle. Accidents of a similar nature have produced similar affections in the course of the spermatic cord; and, as the parts in this situation are very lax and cellular, the rupture either of an artery, or a vein of any considerable size, is, for the most part, attended with a plentiful extravasation of their contents.

In the tunica vaginalis testis, a hæmatocele is sometimes induced by the point of a trocar, or of a lancet, in tapping for a hydrocele, wounding some of the blood vessels of the sac, which, in such cases, are always enlarged.

We are commonly rendered certain of what has happened, by the serum, as it runs off, being suddenly tinged with blood ; but, in some instances, it does not appear till the collection is all discharged, when the first intimation we receive of it is by the sudden appearance of a tumor in the site of the hydrocele. I have now met with three instances of this, in both of which the tumor produced by the extravasated blood arrived at a very considerable height in the course of a few hours.

In some, the disease is produced in a different manner. Where the quantity of serum has been considerable, the sudden discharge of it, by taking away the support which the vessels have been accustomed to receive from it, is not unfrequently the cause of the rupture of some of them ; and, from repeated observation,

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I think it may be considered as certain, that, whenever a large tumor is produced suddenly, that is, in the course of an hour or two, either in the scrotum, or spermatic cord, after the contents of a hydrocele have been evacuated by tapping, that it is entirely the consequence of an extravasation of blood ; for collections of water are never known to arrive so quickly at a considerable size.

In the spermatic process, injuries of the same kind will be attended with a similar effect upon the small veins of the sac containing the water ; and more considerable violence has, in some instances, produced a rupture of the spermatic artery and vein.

But, in whatever way the tumor has been produced, the appearances are nearly similar

to those of watery collections in the same parts ; so that it is not necessary to repeat them here, only it may be remarked, that, when blood is extravasated in the cellular substance of the scrotum, it is easily discovered from a collection of water by the colour, as it assumes all the usual appearances of an echymosis. When the collection is seated in the tunica vaginalis, the means of distinction are not so obvious ; but I may remark, that a tumor produced by blood is heavier than one of the same size produced by water ; and practitioners, much accustomed to handle these swellings, can, in some instances, judge of their contents from their consistence, by the difference which it gives to a manual examination.

The treatment of this kind of tumor is nearly the same with that pointed out in
section

fection iv. chapter i. In the commencement of the anasarous or diffused hæmatocele; when the effect of external violence, whether in the scrotum or spermatic process, the application of ardent spirits, a solution of alum, volatile liniment, or a strong solution of sal ammoniac in vinegar, will, in some instances, remove it. But, when this does not succeed, [and especially if the tumor acquires a greater bulk, it must, in that case, be laid open, and, in every respect, treated in the same manner as has been already directed for the hydrocele; only I may remark, that, if a ruptured blood vessel is discovered, the only effectual means of preventing a return of the swelling, is to secure it with a ligature.

In like manner, all collections of blood, whether in the vaginal coat of the testis,

or in the cyst of a former hydrocele of the spermatic cord, are to be laid open by an incision, extending the whole length of the tumor, and, in other respects, treated exactly as is advised in the fourth section of the preceding chapter, for a hydrocele. And I need scarcely observe, that, if any ruptured vessel comes in view in the course of the operation, it ought to be immediately secured with a ligature: otherwise a constant discharge of blood may be looked for during the cure; the patient will be thereby much incommoded and weakened, and the cure unnecessarily protracted.

It sometimes happens, however, whether the disease is seated in the spermatic process, or tunica vaginalis testis, that the vessels from whence the blood is discharged cannot be discovered; a very considerable oozing, continuing from day to day,

day, notwithstanding the use of bark, vitriolic acid, and every other means commonly employed. As patients in this situation soon become weak and emaciated, one great object of the practitioner is to support them with nourishing food. A moderate allowance of animal food proves always useful; and it is not found even that a liberal use of wine does harm. In some instances, I have even thought that it tended to lessen the discharge.

I have uniformly, however, found, that local remedies prove chiefly useful, particularly the application of ardent spirits, æther, or tincture of myrrh, to the surface of the fore; pledgits of soft lint, soaked in one or other of these, and renewed from time to time, not only serve to check the discharge of blood, but tend, for the most part,

part, to promote the formation of good matter.

In some instances, however, all our endeavours fail, and the patient continuing to lose ground daily, we are warranted in advising any measure that may probably tend to save him. In such circumstances, the extirpation of the testicle has been advised. At one time, I was induced to think favourably of this measure ; but farther experience has not shown, that much dependence is to be placed on it. At least, in two cases, in which it was put in practice, no advantage was derived from it ; while, in both, it was the cause of much additional distress. I do not therefore mean ever to advise it again.

Another variety of tumor produced by blood is mentioned by Mr. Pott, in which the
blood

blood is contained within the tunica albuginea of the testis. It proceeds, he thinks, from a relaxation or dissolution of part of the vascular structure of the testicle; and, when the quantity of blood collected is considerable, it produces, Mr. Pott remarks, a fluctuation somewhat like to that of a hydrocele of the tunica vaginalis.

When this is mistaken for a hydrocele, as it has sometimes been, and an opening with a trocar is made in it, a discharge is produced, of a dark dusky coloured blood, nearly of the consistence of thin chocolate; but the diminution of the tumor, by this evacuation, is seldom considerable.

The perforation, therefore, made in it with the trocar does no good; and as the testicle is commonly so far spoiled by the disease

disease as to be rendered quite useless, castration is advised as the only effectual remedy †.

I have different times met with a disease very similar to this described by Mr. Pott; but as the blood in such instances did not appear to be extravasated, but to be still contained in the vessels of the testis, in an enlarged varicose state, I am not inclined, therefore, to refer this kind of tumor to any species of hæmatocle, but rather to consider it as a variety of varix. I have even seen this variety of tumor mistaken for a hydrocele, and treated as such, by a trocar being plunged into it, when the effects were exactly what are described by Mr. Pott. But, if the blood had been extravasated,

† Mr. Pott's treatise on the hydrocele.

travaſated, a more copious diſcharge would have taken place, from the perforation, than was obtained by it in any of the caſes to which I allude. Even where the tumor has been of a conſiderable ſize, I never found it poſſible to evacuate in this manner, more than a ſpoonful or two of blood; and although, in ſuch caſes, the blood appears evidently more viſcid than in a ſtate of health, it is by no means ſo much ſo as ſhould prevent it from being freely diſcharged by the canula of a trocar, were it lodged in a ſtate of extravafation.

In all the caſes that I have ſeen of this tumor, when it was not opened, but merely ſupported by a ſuſpenſory bag, it has remained indolent and ſtationary for many years. But whenever it has been touched with an inſtrument in order to
diſcharge

discharge its contents, it has from that moment gone wrong. The patient who had suffered little previous pain, soon becomes greatly distressed; the swelling then begins to increase; separate encysted collections form in it; these last burst and leave an ugly sore of an unequal surface, and a putrescent bloody discharge, on which no application has any effect; so that castration at last becomes necessary. Even this does not always afford relief; for, in some instances, such a spongy relaxed state of the vessels takes place along the whole course of the cord, that, though they are secured with ligatures to-day, blood bursts out at different parts to-morrow. Of this I was once concerned in a very distressful instance. After the usual operation of castration, fresh hæmorrhagies occurred at every dressing;

the vessels were at different times secured with ligatures, but to no purpose; the blood burst out again and again; and the patient, after suffering much distress from this cause alone, at last died.

The chief differences which, before laying the parts open, can be observed between this variety of tumor and a hydrocele of the tunica vaginalis, is, that in this, the fluctuation is never so evident as in the other; the tumor is heavy in proportion to its size; the form not so pyramidal as that of a hydrocele; and if properly supported with a bandage, it does not receive any additional increase. Whenever these circumstances, therefore, occur in the same case, they give much reason to suspect, that the disease is of this kind; and, therefore, that no operation should be advised.

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CHAPTER

CHAPTER III.

OF THE VARICOCELE, CIRCOCELE, SPERMATOCELE, AND PNEUMATOCELE.

By the first of these terms is meant, a varicose distension of the veins of the scrotum, which in this state form a tumor of hard knotty inequalities, seldom attended with pain, and, in general, productive of no inconvenience except what arises from its bulk.

The circocèle is a tumor of a nature similar to the former, only it is seated in

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the course of the spermatic cord, and extends from the superior part of the scrotum to the abdominal muscles, and is produced by a varicose distension of the spermatic vein.

These tumors are occasionally produced by pressure on the course of the veins : but for the most part, no cause of this kind can be discovered ; in which case, we conclude that they arise from debility or relaxation in the vessels in which they occur.

When tumors in the course of the veins are perceived to give rise to these swellings, or when the pressure of a hernial truss upon the spermatic cord is discovered to be their origin, the removal of this evident cause of the disease, should be the first attempt towards a cure.

If the pressure of a truss has been the cause of the swelling, an alteration in the bandage may probably remove it. If tumors of a schirrous nature have produced it, their extirpation, when found to be safe and practicable, will be the most effectual means that can be employed; and if the tumors have any tendency to suppurate, warm emolient applications will be the most useful remedy.

But when a general relaxed state of the veins appears to be the cause of their distension, such remedies should be employed as will most effectually recover that tone of which they have been deprived by the long continuance of the disease. For this purpose, nothing commonly answers so well as the use of a proper suspensory bandage, and the application of a solution of alum, a solution of crude sal ammoniac in vine-

gar, and other astringents, to the parts affected.

By due attention to this kind of management, the increase of almost every tumor depending upon this cause, may be prevented; and so much relief will be thereby obtained, as to render the harsh remedies of the knife, the cautery, and ligature, recommended by ancient writers for the removal of these tumors, altogether unnecessary.

By the spermatocele, is meant, a morbid distension of the epididymis and vas deferens, produced, as is supposed, by a stagnation of semen. This may arise from tumors, stricture, or inflammation about the caput gallinaginis, or in the course of the vas deferens; but there is reason to think, that it is most frequently induced by inflammation.

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When produced by inflammation, general and topical bloodletting, gentle laxatives, a low cooling diet, and rest of body, will commonly prove the most useful remedies, and of these none are more to be trusted than topical bloodletting with leeches, which should be repeated from time to time, according to the urgency of symptoms. And again, when tumors are discovered to press upon the vas deferens, this should either be brought to suppurate, or removed with the scalpel, when it can be done with safety. At other times, these tumors are connected with lues venerea; in which case, a well directed course of mercury will be most likely to answer.

By some we are told, that all the other means having failed, castration has at last been found requisite.

This, however, I can scarcely, in any case, suppose necessary ; at least I never met with an instance of its being so.

The term pneumatocele, is applied to signify a distention of the scrotum by a collection of air.

This has been described by most of the ancient writers as a frequent occurrence ; but there is much reason to think, that a great proportion of all the tumors which they describe as containing air, were either formed by collections of water, or by the protrusion of some of the bowels. That species of hernia to which young children are liable, is to this day, by our common people, termed a wind rupture, as is the case with all those collections of water in the scrotum, with which new born infants are affected. But we know well, that
none

none of these tumours are formed by air ; and that their contents are of a very different nature.

In wounds of the lungs, air is sometimes thrown into the surrounding cellular substance, and in that way passes into the scrotum, as it does in particular instances over the whole body ; and in high degrees of putrid diseases, so much air may be separated from the blood, as to distend the cellular substance of the scrotum, as well as of other parts. But a real pneumatocele has never probably existed as a mere local affection of the scrotum ; at least I have never seen it.

In the case of air spreading to the cellular substance of these parts, as a consequence of a wound of the lungs, the same remedy proves effectual that we employ for ana-

farcous swellings formed by water, viz, small punctures with the point of a lancet, which are found to be sufficient for evacuating great quantities of air. But whenever the disease is induced by such a great degree of putrescency in the system, as will effect a separation of air from the blood, there can be little reason to expect any advantage to result from whatever means may be employed.

CHAPTER IV.

OF THE SARCOCELE, OR SCHIRROUS TESTICLE.

THE term sarcocoele, implies a firm fleshy enlargement of the testicle : A simple inflammatory affection of the testis affords a tumor of some degree of firmness ; but the true sarcocoele, or schirrous testicle, is attended with a hardness altogether unusual in the real hernia humoralis, or inflamed testicle.

A schirrous testicle, in the course of its progress, puts on such a variety of appearances,

ances, as renders it difficult, by description, to give an adequate idea of it. In general, however, the accession and progress of the disease are as follow :

An unusual degree of hardness, attended with some enlargement of the testis, is, in general, the first indication of the disease. The parts are not at first discoloured, nor is there any material pain. In a gradual manner, the tumor acquires a larger size. At first, it is smooth and equal, but, with the size of the swelling, it becomes knotty or unequal on the surface, and the hardness becomes more remarkable : Slight pains are felt through the substance of the tumor ; and if it be not suspended, the patient complains of some uneasiness in his back.

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When the constitution is sound, the disease will occasionally remain in this situation for a great length of time ; and, in some instances, by moderate diet, keeping an open belly, suspending the tumor properly, and avoiding violent exercise, the tumor has not only been prevented from increasing, but, in a gradual manner, has been dissolved. This favourable termination, however, it must be owned, is exceedingly rare ; for the tumor, instead of remaining stationary, in general becomes worse. It acquires a larger size ; becomes ragged, and more unequal on its surface ; and the pain, which at first was trifling, becomes more severe, darting, in smart stings through the substance of the tumor.

The inequalities on the surface of the tumor by degrees increase, and continue
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to retain the same kind of hardness with the swelling from which they arise. In some instances, a considerable quantity of serum is extravasated into the tunica vaginalis, which, to those not acquainted with the nature of the disease, gives the tumor the appearance of a common hydrocele; and, at other times, instead of such depositions into the vaginal coat of the testicle, partial collections of matter take place through the whole body of the tumor. These by degrees increase, and the scrotum, which has hitherto been gradually distending, at last bursts, and a discharge takes place from the various collections in the body of the tumor, of a thin, fetid, bloody matter,

In some instances, the spermatic cord becomes hard and enlarged soon after the commencement

commencement of the disease ; but, in general, the cord is not affected till the tumor has acquired a considerable size, and most frequently, I have observed, not till matter has formed in it.

As the tumor of the testicle advances, this affection of the cord also becomes worse. From being at first only slightly tumefied, it gradually turns more hard and swelled ; it becomes so painful, that it can scarcely bear to be touched, and knotty or unequal through the whole extent of it.

The discharge from the openings in the scrotum still continues: But, although the quantity of matter is increased, the size of the tumor is not thereby diminished. On the contrary, it still continues to increase, the edges of the fore become hard, livid, and

and retorted, and fungous excrescences push out from different parts of it.

Whatever was the state of the patient's health on the first attack of the disease, in this advanced state of it, it is always much impaired. He now becomes emaciated, of a pale, wan complexion; and the disease, which, in this stage, is a real cancer of the most malignant nature, turning still more virulent, by the pain becoming more tormenting, the patient is at last carried off in much misery.

Such, in general, is the progress and event of this dreadful disease, if not interrupted by the extirpation of the testis, before it has gone too far. I have already observed, that it exhibits a great variety of symptoms. Those I have enumerated occur most frequently; but no description
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can convey a clear idea of all the appearances that it assumes.

In some, as I have observed above, it remains apparently in an indolent, inactive state, for a great length of time, even for years ; and, in others, it proceeds so rapidly, that, in the space of a few months, I have known it pass through all the changes I have enumerated.

Nor is any age, temperament, or line of life exempted from it : It happens equally to the opulent and to the most indigent ; and I have met with it in all ages, from the sixteenth to the seventieth and eightieth year, but not so frequently in early youth, as in more advanced stages of life.

In a great proportion of cases, the disease begins in the body of the testis, affecting

ing the whole of it equally; but, in some, it makes its first appearance in the epididymis, and occasionally even in the spermatic cord. It has been a prevailing opinion, indeed, that a schirrous hardness, tending to cancer, never begins in the epididymis, and that the testicle is always first affected.

This is certainly in general the case, but every practitioner must, at times, have met with instances of cancer beginning in the epididymis, and sometimes even in the spermatic cord, and spreading from thence to the neighbouring parts. I might here insert different cases which have fallen within my own observation; but Mr. Pott's collection furnishes a sufficient number of well marked examples *.

In

* Treatise on the hydrocele, cases 42, 48, and 49.

In almost every case of swelled testicle from gonorrhœa, the epididymis is not only affected before the testicle, by the inflammation spreading from the urethra, along the vas deferens; but the swelling, when it begins to yield, always first removes from the testicle, leaving, in general, a hardened state of the epididymis, which, for the most part, continues in some degree during life. But, as the hardness produced in this manner is entirely the effect of inflammation upon a membranous or vascular part, so here, as in other parts of the body of a similar texture, we seldom find that hardness induced by inflammation terminates in cancer.

The contrary, however, of this has been too much inculcated; and it has been even said, that the hernia humeralis,

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produced by lues venerea, is a frequent cause of the worst kind of schirrous testicle, which, as the fact is otherwise, has this improper effect, that it prevents the use of, and a proper perseverance in such courses of medicine, as might, in many instances, remove the disease. Nay, the idea has been carried so far, that, in different instances, the testis has been extirpated, when there was much reason to think that the swelling might have been removed by mercury. This, there is reason to suppose, would happen when the scrotum remaining after the operation assumes all the appearances of a venereal ulcer, and is afterwards cured by mercury, as has happened in more instances than one in the course of my observation.

But, although I have said that tumors of the testis, from a venereal cause, seldom
terminate

terminate in this manner, yet I will not go so far, as to say that they never do so; for I know, that a hardened state of the testis and epididymis, produced originally from a venereal taint, does, in some instances, degenerate into the worst species of sarcocele. That is, that although tumors in this part, arising from lues venerea; are most frequently cured by mercury, yet occasionally, and in particular constitutions, the peculiarities of which, however, we are not acquainted with, they do certainly end in schirrus of the worst kind, a disease which might never probably have appeared, if the original venereal taint had not acted as an exciting cause of it. We know that a predisposition to diseases will remain long in a latent state in the system, without any evident affection being excited, till the application of some particular stimulus brings it into action.

In the same manner, a venereal affection of the testis, or even that hardness of the epididymis that remains after an inflammatory tumor of these parts from gonorrhœa, will, in some constitutions, terminate ill, although, in a great proportion of cases, it is otherwise, and no disagreeable effect proceeds from them.

I have dwelt longer upon this than I otherwise should have done, from a contrary doctrine having been strenuously inculcated by one whose authority is deservedly great, and whose observation in this disease has led to the conclusion he endeavours to establish *. But, as the result of my observation has been exactly what I have stated it to be, I could not avoid

* Mr. Pott, Treatise on the Hydrocele, &c. p. 232.

void speaking of it in the manner I have done.

In the treatise to which I allude, we are told, that a hernia humoralis is never, in any instance, productive of this disease. If, on this subject, Mr. Pott's idea is just, it ought undoubtedly to be received ; but, if it is not, it may certainly do mischief, by rendering both patients and practitioners more remiss in cases of sarcocele proceeding from this cause, than they otherwise would be ; as, by continuing still in hopes of a mercurial course being able to accomplish a cure, they may thereby allow the disease to go too far, even for extirpation to be adviseable.

In every doubtful case, when a venereal infection is suspected to be the cause of the tumor, bloodletting, when the

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pulse

is full, an open belly, a cooling diet, a horizontal posture, a proper suspensory bandage, and a well directed course of mercury, will commonly remove it. But, when these means are employed without advantage; and especially, if, during their application, the tumor, instead of decreasing, becomes gradually worse, as soon as, from its increase, there appears to be any risk of its advancing beyond the reach of operation, it ought then, without farther hesitation, to be extirpated, whatever the cause may be by which it was at first produced.

Among other causes mentioned by authors as producing a schirrous state of the testis, is the hydrocele of the tunica vaginalis. From quantities of a serous fluid being frequently found in the vaginal coat of a schirrous testicle, it has been supposed,

ed, that the water, in such cases, was the original cause, and not the effect of the disease in the testis. There is much reason, however, to think, in these collections of water in the tunica vaginalis, in which the testis is found diseased, that the hardened state of that organ ought to be considered as the original disease, and not the water which surrounds it.

Collections of water are, no doubt, often met with, even in the real sarcocele; but this we are to consider entirely as a different stage of the same disease: For, although the true sarcocele is not at first attended with any collection, either of blood or serum, it is natural to suppose, that an enlarged or hard state of the testis must have some influence, both on the quantity and appearance of the fluid with

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which

which the tunica vaginalis is always provided.

If it either produces an augmented secretion, or a diminished absorption of this fluid, a dropical swelling must take place; and every such collection, combined with a scirrrous testicle, has been very properly termed a hydro-sarcocele.

That the testis, by remaining long immersed in the serum, even of a true hydrocele, is frequently altered in its texture, there is no reason to doubt. Thus, on laying open the tunica vaginalis, in a common hydrocele, the testis is very commonly of a more pale appearance than in a state of health.

In some cases, it is much diminished, and, in others, considerably enlarged; but

but all such enlargements, when connected with a real hydrocele, are of a soft, harmless nature, and never give pain. In this state, the testis should never be extirpated.

This is a point I may remark, which it is of much importance to ascertain : For, on the idea of this enlargement of the testis, frequently connected with, and perhaps produced by immersion in the water of a hydrocele, being of a real schirrous nature, the operation of extirpation has been often advised, and unfortunately too often practised. In circumstances of doubt, the means of distinction between the mild and malignant variety of enlarged testicle, by which we should in general be directed, are these : When either the body of the testis or epididymis, or both, are hard and enlarged previous to any collection of serum

rum in the tunica vaginalis, such collections as afterwards take place ought not to be considered as constituting a simple hydrocele. If the tumor has been accompanied with pain, and if, upon discharging the serum by incision, the testis, besides being enlarged, is found in a state of hardness, or is ulcerated on the surface, extirpation should be immediately advised. While, on the contrary, when the water of a hydrocele is known to have been collected while the testicle remained sound, and of its natural size, whatever enlargement it may be found to have acquired on laying the sac open, if the testis is neither of a scirrhous hardness, nor affected with pain or ulceration, we ought unquestionably to proceed as in a case of simple hydrocele; for, enlargements of this kind will be rarely found to excite future uneasiness,

finess, and will consequently seldom or never render extirpation necessary.

In judging of the probable termination of a schirrous testicle, different circumstances require attention : The age and habit of body of the patient, the duration of the disease, and the state it is in at the time.

Thus, whatever treatment is to be adopted, more success may be reasonably expected in a young healthy constitution, than in the reverse ; particularly if extirpation of the testis is to be advised. In the former, the chance of success from the operation is commonly considerable, provided the disease is not too far advanced ; whereas, in old or infirm people, and in habits attended with pale, wan complexions, with

with indigestion, and other symptoms of obstructed viscera, whatever state the disease may be in, little or no advantage can be expected to accrue from any operation.

The complexion, of itself, I must observe, does not, in this disease, merit much attention; for, I have scarcely met with an instance of the true sarcocele even in the early and most simple stage of the disease, in which a pale complexion did not take place. It seems to be, in a great measure, the effect of that anxiety and dread for the final event of the disease, to which patients, with tumors of this description, are particularly liable; but it is materially different from that wan, sickly countenance, often accompanied with a slight tinge of bile, that we meet with in the advanced state of the disease,

case, when attended with obstructions of any of the abdominal viscera.

With respect to the duration of the disease, if it has already subsisted for a considerable time without making progress, there will be reason to think that it is of a mild nature, and that the system is not so much affected as if its progress had been great and rapid ; and, lastly, the state of the tumor at the time is of much importance in forming a prognosis of the event. As long as the testicle is only somewhat hard and enlarged, without the formation of matter, and without any disease of the cord, if the constitution is otherwise healthy, there will be much cause to hope for a favourable event from any operation that is advised.

But,

But, on the contrary, when the disease is so far advanced, that collections of matter have formed, either upon the surface of the testicle, or in its more internal parts, as in this state there will be cause to suspect that the constitution has suffered from absorption, so there will be less cause to hope that the operation will prove successful than in the more early stages of the disease. And this is more remarkably the case, when ulcerations have taken place on the surface of the tumor; for, we know well that absorption is much more apt to take place from tumors in a state of ulceration, than from matter to which the air does not get access.

In whatever state, however, the tumor may be, there is always reason to hope for more success from the operation, while the spermatic cord is yet found, than when it
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has become diseased ; for, as soon as the cord is much affected, the chance of success from any means to be attempted will always be proportionally less. The cord, indeed, may, towards its under extremity, be diseased, even in the same manner with the testis itself, without lessening the chance of benefit from the operation ; but, whenever the disease has spread so far up the cord, as to render it doubtful whether the parts affected can be all removed by the knife or not ; and especially, if there is reason to think that the cord is diseased within the boundaries of the abdomen, instead of there being, in such circumstances, any advantage to be expected from the operation, every attempt towards the removal of the parts below, will, for certain, tend to aggravate the symptoms, and hasten the death of the patient.

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When a fchirrous or cancerous tumor is fo fituated, that it can be entirely removed, the operation ought immediately to be advifed ; but, when the difeafe has advanced fo far as to render this impoffible, in whatever part of the body it may be feated, no attempt of this kind fhould be made, the fact being now clearly afcertaincd, that cancerous affections are always rendered worfe by extirpation, when all the difeafed parts cannot be removed.

It is of much importance, however, to obferve, that the fpermatic cord is frequently affected with a fulnefs and thicknefs of its parts, produced by the weight of the tumor alone, without being in any other refpect difeafed. A fulnefs of this kind, when the cord itfelf is not painful, and when there are no knots or inequali-

lies upon its surface, ought not to prevent the operation, when, in other respects, it appears necessary ; for, a mere enlargement of the cord very frequently occurs, either from a variocose state of the vessels, or from a watery deposition in the cellular substance of the part, when it is not in any other manner diseased *. But, on the contrary, when the cord, at the same time that it has become enlarged, hard, and knotty, adheres to the neighbouring parts, is painful to the touch, or ulcerated, these, if the disease extends over the whole process, up to the abdominal muscles, are circumstances which, with every prudent
R practitioner,

* Of the point here inculcated, some singular proofs are recorded by Mr. Pott, in his useful collection of cases. See Treatise on Hydrocele, cases xxxix. xl. xlix. and l.

practitioner, will, at all times, forbid the operation of castration.

It has, indeed, been proposed, in this state of the cord, to enlarge the opening in the external oblique muscle, so as, by dissection, to trace the diseased parts even into the cavity of the abdomen, with a view to remove them entirely. But, although theoretical writers may attempt to amuse their readers with such proposals, they will never be seriously thought of by practitioners, whose opportunities, for observation enable them to think and act for themselves.

It is unnecessary to enumerate either internal medicines, or external applications, as none have been employed with advantage, for the removal of this disease. Cicuta and belladonna, so much celebrated
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in cancerous affections, have no effect in arresting its progress, or in mitigating its symptoms. It is on the extirpation of the diseased parts that we alone rely for a cure: Hence, it is a point of the first importance, to ascertain the period of the disease at which the operation is most advisable.

I have already observed, that occasionally we meet with a schirrous enlargement of the testis, with which patients walk about for a great length of time, with little or no inconvenience. Such instances, however, are exceedingly rare; for, by much the greatest proportion prove to be of a malignant nature, and proceed rapidly to a state of pain and hazard. I may therefore observe, that, whenever a schirrous or hardened state of the testicle does not yield to the means commonly employed,

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such as moderate evacuations of blood; when these are indicated, a cooling diet, a lax belly, the use of a suspensory bandage, and especially when mercury, which, on the chance of the disease being venereal, is very commonly tried, are all used without advantage, we may, in such circumstances, always have much cause to suspect that the disease is of a bad nature. When more inveterate symptoms appear; when the tumor, which, till now, was in a hard indolent state, becomes painful, and increases in bulk, no further delay should be advised. For, however improper it would be to remove a hardened testis, which, for a considerable time, had remained indolent, without pain or increase, yet it would be equally unpardonable in any practitioner to advise the operation to be delayed, when matters are so far changed, that the tumor is become
painful.

painful, and daily becoming larger. In such circumstances, the sooner the diseased parts are removed, the greater will be the chance of a recovery ; and not a day, therefore, should be lost : for, whatever may be the opinion of the late Mr. Sharpe on this point, and some others who appear to have copied from him, it has long been a fixed maxim with the most experienced surgeons, that, in all schirrous or cancerous affections, the risk of a relapse after the operation, is commonly in proportion to the duration of the original disease*.

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* The opinion of the late Mr. Sharpe on this point was singular in a man of such extensive experience. He considered the risk of a relapse, after the extirpation in cancerous tumors, to be greater in.

The extirpation of the testicle being at last resolved upon, the method of performing the operation is this: The patient must be laid on a table, of a convenient height, with his legs hanging down, and firmly secured by two assistants on each side; one at each arm, and another supporting each leg. The parts being previously shaved, if the tumor is large, an assistant must be employed to secure it; if only, however, of a moderate size, it is better for the surgeon to do it himself. With one hand, therefore, he should grasp the swelling, so as to keep it firm, and, with a scalpel in the other, an incision should be made along the whole course of it, beginning at least an inch above the
part

in the more early periods of the disease, than in their more advanced states. *Critical Inquiry*, 4th edit. p. 108.

part where the cord is to be cut, and continuing it through the skin and cellular substance to the inferior part of the scrotum. The easiest method of doing it, both for the surgeon and patient, is by one continued stroke of the knife, as it is both more quickly and more neatly performed in this manner, than in the usual way of pinching up the skin between the finger and thumb before cutting it; and there is no kind of difficulty or risk in doing it in this manner.

The spermatic cord being thus laid bare, the surgeon, with the finger and thumb of one hand, should raise it from the parts beneath, so as to be enabled to pass a broad waxed ligature round it: It is easily done with a large curved needle, or even with a blunt probe, with an eye at one end. , With this ligature, a running

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knot

knot should be made upon the cord about half an inch above where it is to be divided.

The cord being at this part cut across with the scalpel, the testicle is then to be entirely removed, by dissecting the cord and it from above downwards, so as to separate them as easily as possible from the surrounding parts, without injuring the sound skin with which they were covered. Different instruments have been proposed for facilitating the separation of the testis from the contiguous parts; but none with which we are acquainted answers the purpose so well, or with such expedition, as a scalpel.

When the diseased parts are removed, any arteries of the scrotum, that have been divided, should be first secured with
ligatures,

ligatures, by means of the tenaculum. This being done, the spermatic artery and vein should be gently separated from the nerve with which they are in contact, and, by the aid of a tenaculum, should be tied with a small ligature of waxed silk. By including the nerve in the ligature, as is commonly done, we render this the most painful part of the operation, while no advantage whatever is gained by it.

The ligature previously passed round the cord, should be untied ; but it should not be withdrawn : Lest the ligatures of the spermatic artery and vein should give way, this ligature should be allowed to remain during the first eight or ten days of the cure, and, being perfectly loose, no harm can be done by it. It is meant merely as an additional security, and to serve as a kind of tournequet, in the event

of any hæmorrhage taking place ; so that, in circumstances such as we are now considering, it ought always to be left loose. There is, in fact, no more necessity for allowing this ligature to remain tied, than for leaving a tournequet firmly applied upon any of the extremities after the operation of amputation ; and yet, instead of one ligature, such as this, it has been the practice with many to apply two, about half an inch distant from each other ; and these they leave firmly tied upon the whole substance of the cord during the cure of the sore *.

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* Even the late Mr. Sharpe gives these directions. *Vide* Treatise on the Operations of Surgery, 10th edit. p. 55.

There is, however, no necessity for this precaution, as all manner of risk may be prevented, by securing the blood vessels in the manner I have pointed out. I have often done the operation in this way, and no hazard has ever ensued from it. By leaving the ligature at the upper part of the wound untied, it may be made use of, as I have already observed, to compress the cord, in the event of the blood vessels bursting out again ; but, when the ligature upon the spermatic artery and vein is properly applied, this will never happen ; and when it occurs from neglect or mismanagement, any severe hæmorrhage may always be prevented by the ligature left for that purpose.

On the different blood vessels being secured, the edges of the cut should be laid exactly together, and secured with adhesive

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five plaster, when the retraction is inconsiderable; and, with the interrupted suture, when it appears from the retraction that takes place, to be necessary. At the same time, care should be taken to leave the ends of the ligatures employed for securing the blood vessels, hanging out at the edges of the wound, to admit of their being withdrawn, when, in the course of the cure, they appear to have become loose. The whole scrotum should be covered with a pledgit of soft linen, spread with saturnine cerate; and a cushion of tow, covered with old linen, being laid over it, the whole should be secured with a suspensory bag, or the T bandage.

At the end of the second or third day, the dressings should be removed: It is easily done, when the parts are covered in the manner I have advised, with cerate; and

and it always keeps the patient more comfortable, than when the first dressing is long delayed. For the same reason, the dressings should be removed daily. In the course of eight or ten days, the ligatures commonly separate, and are easily taken away. About the same period, the ligature passed beneath the spermatic cord, may be withdrawn; and, by the fourteenth or fifteenth day, the cure, when conducted in this manner, is for the most part complete.

Hitherto we have been supposing that the teguments covering the testicle are sound, in which case none of them should ever be taken away; but, when the skin has become thin and inflamed, and especially when any of it is in a state of ulceration, all such parts of it should be removed along with the testicle. In such
circum-

circumstances, the best method of doing the operation is this : Instead of a longitudinal cut along the course of the testicle, the first incision should be carried in a straight line to the under extremity of the spermatic cord, from whence two semilunar incisions should be continued to the under part of the scrotum, and, in their course, should be made to include all diseased parts of the skin.

The remainder of the operation should be finished in the manner described above, and the skin included in the two semilunar cuts is not to be dissected off by itself, but removed along with the diseased testicle.

Even where a considerable portion of the teguments have been removed, the fore may be covered with skin ; nor should
this

this ever be omitted, when we find that it can be done ; for it not only hastensthe cure, but serves as a more firm protection to the end of the spermatic process, septum scroti, and contiguous parts, than the new scarf skin, with which alone they would otherwise be covered. But, when the remaining teguments will not stretch so much as to admit of their being retained either with plasters or futures, the cure must necessarily be conducted in the usual way by dressing with pledgits of any emollient ointment, till a cicatrix is induced. The advantages, however, that we derive from being able to cover the fore entirely with skin, are so great, that every operator should keep it anxiously in view ; for, besides those I have mentioned, it saves a great deal of pain and confinement, to which the patient must otherwise submit.

mit. It admits, indeed, of a cure in the fourth part of the time commonly required when the edges of the skin cannot be kept together.

From the descriptions usually given of the operation of castration, we would be induced to consider it as one of the most simple, as well as the most easy in surgery; and it must be admitted, that, in the early stages of a sarcocele, scarcely any difficulty ever attends it. But it is right that the younger part of the profession should be informed of what all practitioners of experience must have had opportunities of observing, that scarcely any operation is productive of more perplexing occurrences in the advanced periods of the disease.

When the spermatic cord is so far diseased, that we are obliged to divide it
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near the abdominal muscles, if the upper part of it is not previously secured with a ligature, it is apt to retract within the abdomen, so as to render it impossible to secure it in any other manner than by dividing the abdominal muscles. Of this I have now been present at two instances; in both of which the cord retracted suddenly, and with a smart jerk, instantly on being divided.

In the one, no ligature had been applied, as the assistant imagined that he could secure the cord between his finger and thumb, till the spermatic artery could be tied, but in which he was mistaken; and, in the other, the ligature not being tied sufficiently tight, it slipped off from the end of the cord; and, in both instances, the patients died of the effect of the hæmorrhage. External pressure

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was

was the only remedy that could be employed ; but, although, in both instances, it gave, from time to time, a temporary check to the discharge, it did not, in either case, prove effectual ; so that, after various returns of the hæmorrhage, the patients were at last carried off by inanition.

In all cases, therefore, where the cord must be cut in the upper part of it, a strong ligature should be previously firmly tied as far as possible above the part in which the division is to be. It should be applied with a running knot, and left of such a length as to admit of the ends of it hanging freely out of the wound, after any retraction that may take place. Being made with a running knot, it may be easily undone, whenever it may be supposed that no hæmorrhage will occur on its being

ing withdrawn ; and, if the end of the ligature is twice passed through the first noose, it will be sufficiently firm.

The pain attending this mode of applying the ligature is, no doubt, much greater than when the nerve is avoided ; but, in the situation to which I allude, where the cord is cut near to the abdominal muscles, this cannot, with safety, be done, and should not, therefore be attempted.

In considerable enlargements of the testis, the tumor is apt to press so much upon the septum scroti, and, in some instances, adheres to it so firmly, that the cavity of the tunica vaginalis of the opposite side is sometimes opened in the course of the operation. Of this, I have been present at different instances : In some, no

inconvenience ensued from it; but, in others, inflammation, to an extensive degree, was induced in the corresponding testicle. With sufficient caution, however, in the removal of the tumor, all this may be prevented; for, however large it may be, the dissection may be always accomplished without perforating the septum. When it is perceived, however, that an opening is by accident made in it, in order to prevent that inflammation of the testis which free access of air very seldom fails to induce, I would advise the divided parts to be neatly and gently drawn together with a ligature, in such a manner as to admit of its being easily withdrawn in the course of the cure. By this, we also prevent blood and matter from finding access to the tunica vaginalis.

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But the most distressful part of this operation arises from that enlarged state of the arteries of the scrotum, which takes place in every instance where the tumor has acquired a great bulk, and from which practitioners occasionally meet with more embarrassment than is usually experienced in any other operation. Instead of one, two, or three arteries, very inconsiderable in size, which, in the first stages of the disease, are all that we perceive, in the more advanced states of it, we sometimes meet with six, eight, or even more, and all or many of them of such a size as to require immediate attention.

In this period of the disease, the patient is commonly weak and delicate; so that, not being able to bear the loss or much blood, his strength would sink, if arteries of the size which these often ac-

quire were allowed to bleed during the remainder of the operation. During the removal of the tumor, one or more assistants should be employed for the sole purpose of putting a stop to the discharge, by placing a finger upon every artery, as soon as they perceive it to be cut; nor should the pressure be removed till the dissection is finished, and the surgeon in readiness to secure the bleeding vessel with a tenaculum and ligature. This being done over the whole surface of the fore, he next proceeds to tie the spermatic artery, and to finish the operation in the manner I have mentioned.

From the want of this attention, I have known such quantities of blood lost, as have either proved quickly fatal, or induced such debility and relaxation, as
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the patient never recovered from ; and, as I have in different instances known even surgeons of experience fail in the proper management of this part of the operation, I think it right to say, that the younger part of the profession cannot be too much on their guard in performing it.

Besides the common form of sarcocoele, that I have thus given an account of, we find, that, in all workers among foot, the testis is liable to be attacked with cancer that first begins in the scrotum.

It first appears on the anterior and under part of the scrotum, sometimes in the form of a warty excrescence, and in others, of a foul, superficial ulcer, with hard retorted edges. From the suspicious

situation of the fore, and from the appearances which it exhibits at first, it is often suspected to be venereal ; but no advantage is derived from mercury, nor from any dressings that have been employed. If not prevented by early extirpation, the ulcer spreads over the scrotum, and from thence to the testis, spermatic cord, and inguinal glands ; giving to the parts that it attacks all the ordinary and characteristic marks of cancer.

This variety of cancer appears obviously to be produced by foot ; for it is found, that, besides chimney-sweeps, those who are employed in manufactures in which foot enters as an ingredient, are occasionally seized with it. And it also appears, that the foot acts altogether locally in producing it ; for, when the fore is extirpated

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ed early, that is, soon after it has appeared, and before it has spread over any great extent of surface, the disease seldom returns, either there or on any other part.

As no other remedy has been discovered, for none that I have either tried or heard of, has any influence in curing the fore, I would therefore advise the diseased parts to be extirpated as early as possible. This, while the ulceration is confined to the scrotum, is easy both to the patient and surgeon, when compared with the operation of castration, which must always take place when the testis becomes diseased, and is therefore a strong inducement for our insisting that no time should ever be lost in putting it in practice.

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I may farther observe, that arsenic, caustic, red precipitate, corrosive sublimate, and other irritating applications, produce the same effects in this as in other varieties of cancer.

When applied so as to remove the diseased parts entirely, they perform with much more pain, and in a much more tedious manner, what may be more neatly done by the scalpel at once: while, so far as I have observed, none of them are productive of any other advantages, at the same time that, by the irritation which they excite, they very frequently do much harm.

Many accounts have been communicated to the public of this and other varieties of cancer being cured by escharro-

tics of different kinds, and chiefly by arsenic, which appears to form the basis of a great proportion of the remedies of this class, that have been employed for the cure of this disease. But, while all of these, as well as the internal use of hemlock, and of every other medicine I have known employed, have failed in every instance, they have very commonly had the effect of amusing the patient with hopes of a recovery, till it has been too late even for the extirpation of the diseased parts, to prove successful.

I have, therefore, no hesitation in asserting, that the operation should be advised in the early stages of the disease, and that no other remedy, with which we are yet acquainted, should ever be relied on,

Besides,

Besides those affections of the testes and their coverings, that I have described, there is another, that seems to be peculiar to warm climates. It is met with frequently on the coast of Africa, and in the West Indies ; in some instances in Europeans, but chiefly in Negroes.

An uniform, firm, colourless swelling attacks the whole substance of the scrotum. It is seldom, for a considerable time at first, accompanied with pain ; but, when it passes from the cellular substance of the scrotum to the testes themselves, which, in some instances, happens, it, in this state, always excites a great deal of distress.

In the early stages of the disease, the external application of astringents, accompanied

panied with a course of mercury, has, in some instances, proved useful. But, when the tumor has become large, a cure has never been obtained of it. In this situation, the patient obtains no relief, but from a proper application of a suspensory bag, and, in severe degrees of pain, from large doses of opium.

EXPLANATION OF THE PLATES:

IN Plates i. ii. and iv. various forms of the Trocar are delineated, for discharging the contents of a Hydrocele.

Fig. 3. Plate iv. was the first improvement made upon the common round form of this instrument with a triangular point, that I suggested many years ago ; since which period, it has been commonly used for this operation, and of a larger size for the paracentesis of the abdomen. The Perforator should be of the form of a common Lancet, so that, when properly made, and the Canula fitted with exactness, it enters with nearly the same ease as a Lancet.

The point of the Perforator is commonly made too long. It should not pass above the fourth or fifth part of an inch through the Canula. Of this length it is less apt to injure the testis on being pushed into the tunica vaginalis.

Fig.

Fig. 1. Plate i. A Trocar, the invention of Mr. Andrée. Fig. 4. The Canula, formed of two plates of elastic steel, firmly united at their large extremities, by two screw nails. The tube formed by the hollow of these plates is of such a size as to allow the Perforator, fig. 3., to be easily pushed through it; and the elasticity of the plates, which admits of their yielding to this passage of the Perforator, makes them return instantly to form the same size of tube, as soon as the large extremity of the Perforator has passed entirely through.

The point of the Perforator, with a small portion of the end of the tube, being pushed into the tunica vaginalis, the Perforator should be withdrawn, which, when the instrument is properly made, is done without much force.

Fig. 1. Plate ii. A Trocar of a flat form. It consists of a Stilette or Perforator, fig. 3., and a silver Canula, fig. 2. The Canula being open on one side, it thereby admits of the Perforator being of a greater breadth from one end to the other. Hence the Perforator makes an opening that admits the Canula to pass with ease; and, as the sides of the Canula do not fall together on the Perforator being withdrawn, this instrument is not liable to an objection that has been adduced against the Trocar of Mr. Andrée, from the risk of injuring

ing the parts with which it comes in contact, on the steel plates of the Canula falling together, which they do with some force, on the Perforator being withdrawn.

This instrument is the invention of Mr. Wallace, a surgeon of eminence in Glasgow.

Plate i. Fig. 2. A Bistoury, mentioned p. 92, for perforating the tunica vaginalis testis.

Plate ii. Fig. 4. A Syringe for injecting liquids into the tunica vaginalis testis. This instrument is used by some practitioners, but it does not answer so well as the Bag of Refina Elastica, in plate iv. fig. 1. It requires to be exactly fitted to the pipe, fig. 2. plate iv.

Plate iii. Fig. 2. A silver Canula and steel Perforator, for the purpose of introducing a Seton in abscesses, or for the cure of the Hydrocele of the tunica vaginalis; Fig. 1. the Perforator, Fig. 4. the Canula.

The groove in the end of the Canula, as well as of the Perforator, is for the purpose of enlarging the opening at the inferior part of the tumor where the Seton passes out; and it is easily done by cutting upon this groove, either with a Scalpel or Bistoury. The method of using this instrument is described, p. 90.

Fig. 3. A grooved Director. This is also meant for the purpose of passing a Seton in the operation for the Hydrocele. The method of using it is described, p. 89.

Plate iv. Fig. 1. A Bag of *Resina Elastica*, fitted with a silver Canula and Stop Cock, for the purpose of injecting wine and other liquids into the cavity of the tunica vaginalis, after discharging the contents of a Hydrocele, by puncturing the sac with the flat Trocar, Fig. 3.

Fig. 2. The Canula and Stop Cock separate from the Canula of the Trocar, as well as from the elastic Bag, with both of which it is connected in Fig. 1.

This Canula is made with a screw, for the purpose of connecting it, either with the Bag of elastic gum, or with the Syringe represented in Plate ii. Fig. 4. For the method of using the instruments of this Plate, see p. 145.

DIRECTIONS FOR THE BINDER.

ALL the Plates, with the Explanations, to be placed immediately before the Index.

PLATE I.

Fig. 1.



Fig. 2.

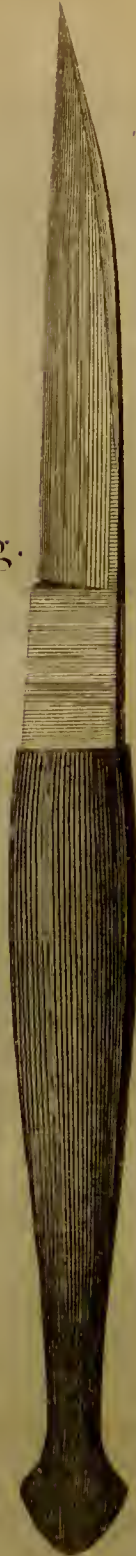
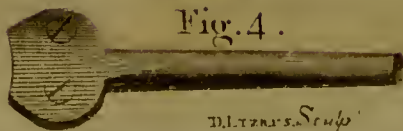


Fig. 3.

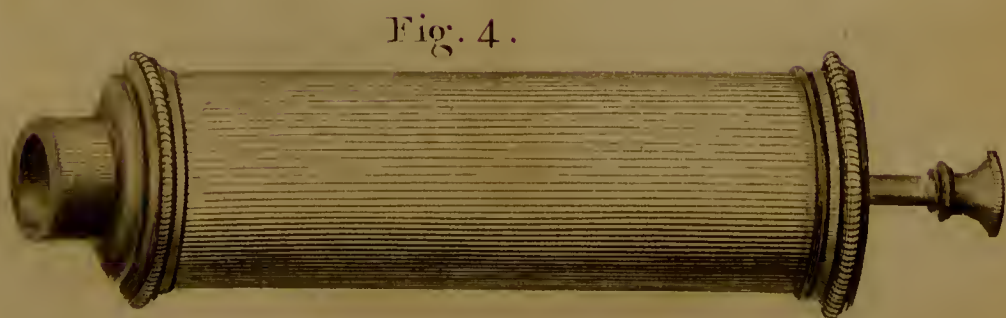
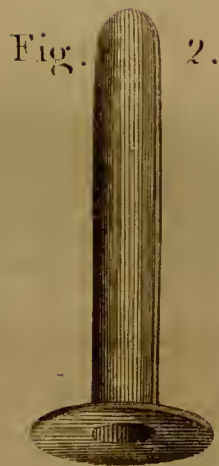


Fig. 4.



W. L. T. & S. Sculp.

PLATE II.



DELIZAVES. Sculp.



PLATE IV.

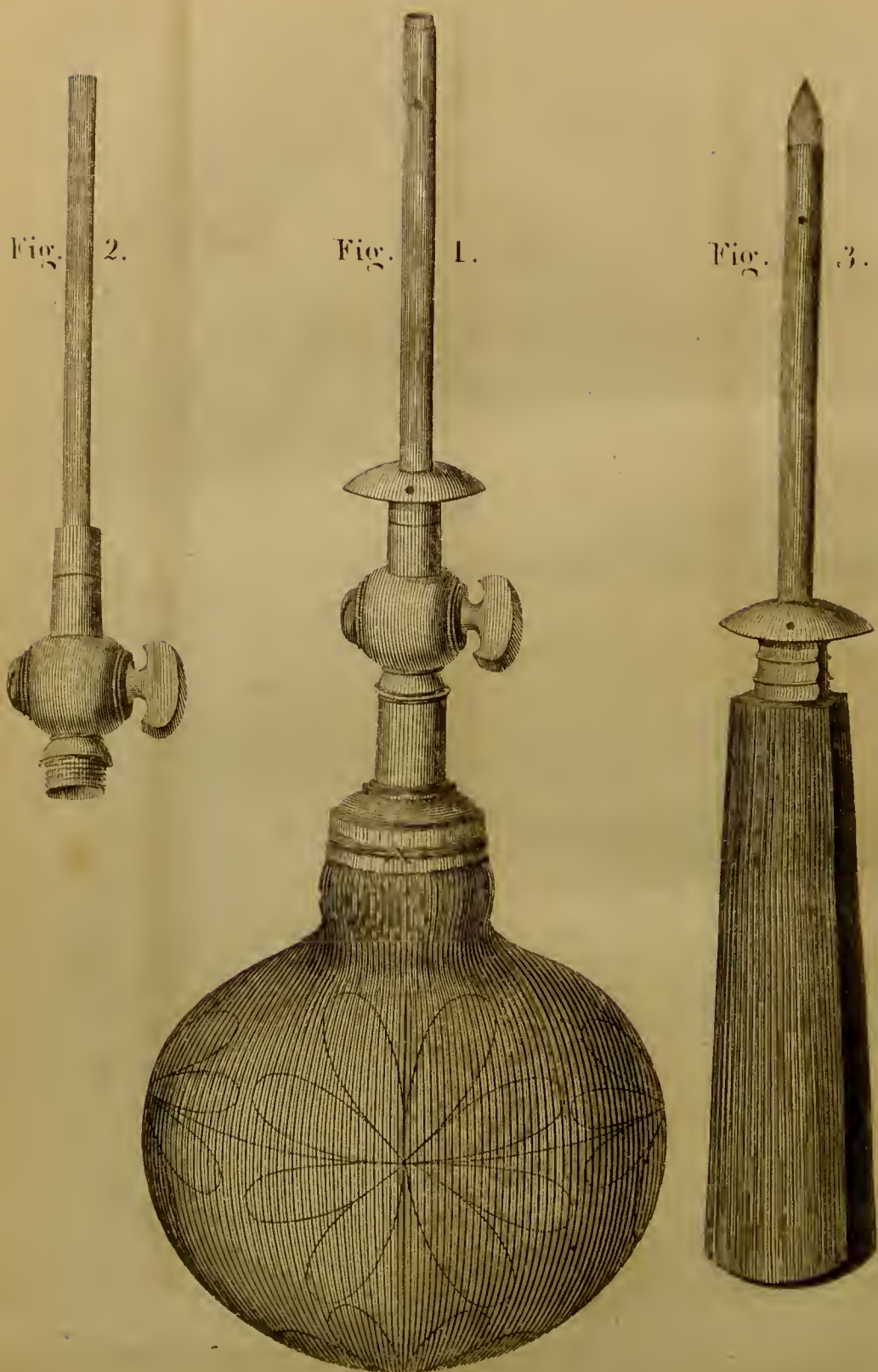


PLATE III.



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